FAO Fisheries Report No. 519 FIRM/R519
ISSN 0429-9337

Report of the

EXPERT CONSULTATION ON GUIDELINES FOR RESPONSIBLE FISHERIES MANAGEMENT

Wellington, New Zealand, 23-27 January 1995

Food
and
Agriculture
Organization
of
the
United
Nations

FAO Fisheries Report No. 519 FIRM/R519

REPORT OF THE

EXPERT CONSULTATION ON GUIDELINES FOR RESPONSIBLE FISHERIES MANAGEMENT

Wellington, New Zealand, 23-27 January 1995

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
ROME, 1995

This One
QCFE-ZRY-ZGJQ

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

M-43
ISBN 92-5-103691-8

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying or otherwise, without the prior permission of the copyright owner. Applications for such permission, with a statement of the purpose and extent of the reproduction, should be addressed to the Director, Publications Division, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, 00100 Rome, Italy.

© FAO 1995

PREPARATION OF THE REPORT

The first draft for the guidelines for Responsible Fisheries Management, as prepared by the FAO Secretariat was tabled as document FI:CCRF/94/Inf.5. August 1994 at the Technical Consultation held in Rome 26 September to 5 October 1994. These draft guidelines were also used to provide as a starting point for discussion of a group of experts on fisheries management in the Consultation reported on here. This report provides a commentary on the draft guidelines included as Annex 7 to this document, plus a revised outline prepared by this Consultation for further commentary and development. This material is intended to facilitate the process of drafting an improved set of Guidelines for Responsible Fisheries Management.

Distribution

Participants
FAO Fisheries Department
FAO Regional Fisheries Officers
Future Meeting on the Code of Conduct

FAO.
Report of the Expert Consultation on Guidelines for Responsible Fisheries Management. Wellington, New Zealand, 23-27 January 1995.
FAO Fisheries Report. No. 519.
Rome, FAO. 1995. 100 p.

ABSTRACT

The Expert Consultation discussed the draft Guidelines for Responsible Fisheries Management (Document FI:CCRF/94/Inf.5. August 1994, and the needs and directions for its revision and improvement. Two informal Working Groups worked through the document presented as an annex to this report, making a paragraph by paragraph commentary and critique, respectively from the perspective of the fisheries managers, and from that of the technical staff responsible for implementing management guidelines. A new structure was proposed for the document, as well as a list of new topics to be addressed, and a strategy for tackling this task. Appended are the reports of the two Working Groups, and the proposed contents of Annexes to the New Guidelines.

CONTENTS

Page

Introduction 1

Organization of the meeting 1

The main conclusions of the Consultation 2

End result of the Consultation 4

Annex 1. Participants 6

Annex 2. Agenda 9

Annex 3. Proposed outline structure of revised Guidelines for Responsible Fisheries Management 10

Annex 4. Report of Working Group I 12

Annex 5. Report of Working Group II. 33

Annex 6. Listing of possible issues/ideas to be covered in the next draft of the Guidelines 45

Annex 7. Guidelines for Responsible Management of Fisheries 49

Figure 1. The content of the guidelines for Responsible Fisheries Management, within the International Code of Conduct for Responsible Fisheries 5

Figure 2. The proposed scope of the guidelines for Responsible Fisheries Management, as discussed during the introduction to the Expert Consultation 5

Figure 3. Example of a decision flow chart for managed fisheries 42

INTRODUCTION

1. The Consultation took place in the offices of the Ministry of Agriculture and Fisheries, Wellington from 23-27 January 1995, with the terms of reference of reviewing document FI:CCRF/94/Inf.5 "Guidelines for responsible management of fisheries" (first draft) which is reproduced in Annex 7. The list of experts and observers attending the Consultation are given in Annex 1.

Organization of the meeting

2. The draft agenda for the meeting was adopted (Annex 2).

3. It had proved effective in earlier meetings on the Code that most of the work be carried out in small working groups; especially given the relatively large number of participants. This was the format adopted in the present Consultation; The plenary was reserved for broader discussions on overall issues and for organization and scheduling of the meeting. Two such Working Groups were convened:

I Assembling information, technical analysis and advice

This group reviewed the draft Guidelines from the perspective of whether they are useful to those who are obliged to implement management decisions at the technical level. For example, are provisions for data gathering and reporting adequate? What criteria should be set for assessments? How should scientific conclusions on the safety of the resource be translated in practice into recommendations on overall catches and/or effort?

II Translating technical advice into management action

This group reviewed the draft Guidelines from the perspective of fisheries managers and users of the resource. It was asked if the overall policy directions implied by the draft document are correct from a societal perspective, and whether the use of the document by fisheries managers could make a contribution to the management of the fisheries sector. Is it feasible to translate the provisions of the document as presented, into fisheries regulations which can be effectively enforced?

4. The Working Group activities included:

- Working through the issues mentioned in document FI:CCRF/94/Inf.5 from the perspective suggested above.
- Checking that the Guidelines are complete and compatible with the Principles for responsible management resulting from the Technical Consultation on the Code of Conduct for Responsible Fishing (Rome, 26 September-5 October 1994); (the Consultation did not discuss the merits of the draft Code).
- The Working Groups did not spend much time redrafting the document, but concentrated on identifying omissions and errors in the draft. A major result of this review was the suggestion by Working Group I of a new outline for the Guidelines, given in Annex 3, which was accepted by plenary.

The Reports of these two Working Groups are given in Annexes 4 and 5. Chairmen of the Working Groups reported to plenary on a daily basis.

The scope of the Consultation

Without ignoring the precautionary approach in discussing the document, a detailed consideration of this issue was left to the report of the Expert Consultation on this subject to be held in June in Sweden. It is suggested that the report of this future meeting be used to develop an annex to the present Guidelines spelling out the implication of the precautionary approach for fisheries management. A diagram showing where the guidelines fit into the Code of Conduct as a whole, is given in Fig. 1, and an indication of the proposed scope of the Consultation, in Fig. 2.

The main conclusions of the Consultation

The Guidelines should be written bearing in mind in their further development, the context provided by the 1982 United Nations Convention on the Law of the Sea, and need also to make explicit reference to provisions of Chapter 17 of Agenda 21 of UNCED, which suggests addressing in a balanced fashion utilization and conservation in the context provided by sustainable development.

The main findings and recommendations of the Consultation are summarised below and further detail is given in the Reports of the two Working Groups in Annexes 4 and 5.

The main conclusions are:

As written, the draft Guidelines place excessive emphasis on the administrative aspects of fisheries management. The central role of the social contract between those parties involved in fisheries management needs further emphasis: requiring the collection of social and economic data in addition to biological information.

The draft Guidelines emphasise a top-down approach to management which is not applicable in all circumstances. Specifically, community based or other devolved systems of management should be explicitly included in the Guidelines. There is also the need to broaden the focus to include aspects of different types of fisheries. The Guidelines should have sections and/or annexes which deal with issues related to artisanal fisheries, sports and subsistence fisheries.

Working Group II noted that the identification of rights and their ranking by priority, and a clear distinction between claims and rights of the different interested parties will be an early requirement for States seeking to apply these Guidelines. This is especially important, since one of the main roles of fisheries management is to resolve conflicts between different parties, and to provide practical trade-offs between the objectives of these parties.

Working Group I noted that the Guidelines as presently envisaged are focused on marine fisheries. They will have applications in freshwater for large lakes but it would be more useful to have a separate set of Guidelines developed for inland waters, using the present set as a starting point. (This proviso applies in the more general case that the Guidelines need adapting to the particular circumstance, rather than being applied unchanged).

The document as it stands tends to make judgements on a number of issues. The Consultation felt it more appropriate to assist managers in the practical application of responsible fisheries management and for the Guidelines to report common practice in a wide range of fishery management situations. Preparation of a wide review or synopsis of a broad range of fisheries management situations would be of value in parallel with the further development of the Guidelines.

In designing a management system, the Consultation emphasised the importance of first choosing appropriate objectives and then designing the system including incentive structures that will help ensure success. In particular it noted that open access fisheries do not provide any incentive for self management.

Cross references to other sections of the Code

The Consultation identified three major areas where there were overlaps with other parts of the Code. There should be cross references to other parts of the Code such as research, ICAM and fisheries operations.

It was noted by Working Group I that the Guidelines for Fisheries Research do not provide guidance with respect to the organization of a research programme to support management, and that this will presumably need to be covered in these Guidelines.

The Guidelines for Fishing Operations touch only briefly on Monitoring, Control and Surveillance, and these issues are not yet covered in these Guidelines. This was identified as an area which needs to be extensively developed as a technical annex.

A number of areas considered too briefly in the present draft such as biodiversity, by-catch, discards and critical habitats in the coastal area need to be amplified; bearing in mind their likely overlap with the Guidelines for the Integration of Fisheries into Coastal Area Management which need to be cross referenced.

A new structure for the document

Annex 2 was developed as a more logical index of matters to be covered by the Guidelines.

As a partial alternative to writing many annexes, the Guidelines could make more reference to FAO and other documents which already provide detail on aspects of the Code which are available in more than one official language.

At present, the document reads more like a tutorial than a guide to actions which can be followed in order to achieve responsible fishing. An executive summary could be helpful, and/or the Introduction should briefly anticipate all of the issues dealt with in detail later in the text. The need for ease of reference and application was addressed by Working Group II, which suggested flow charting the concepts within the management framework, and to show the relationships of entities involved within the management process.

As a general comment, the criteria for allocation of material to the text, the boxes, and the annexes needs to be clarified.

Scope and use of the document

Providing the necessary generality to allow a single set of Guidelines to be used for a wide range of fisheries situations was recognized as very difficult. Two approaches were suggested as helpful:

1) A provisional set of definitions was provided in the draft document, and have been revised in the Report of Working Group I. These definitions would need to be reviewed and made more specific when the document is applied to a particular fishery. As such, a proper understanding of paragraphs 1, 5 and 6 is essential to proper use of the document, and these paragraphs were redrafted under the heading of "Scope and applications of the Guidelines" to provide the necessary generality.

2) Specific options for the management mechanism used, or for the main types of jurisdiction under which management occurs, can be spelled out in more detail in technical annexes.

Contents and focus of the document

The document focuses too much on the role of the fisheries management organization: there should be more emphasis on the need to harvest the resources in a responsible fashion.

The document as it stands focuses overly on the temperate water, industrial fishery context. It needs to be widened to include the realities of tropical water, developing country, artisanal fisheries also.

More is needed on developing mechanisms for participation, and how to address conflicting interests. Consideration should be given in the document to the special needs of smaller management bodies such as local entities delegated management responsibilities, or small island States, and there should be a section explaining how to use these Guidelines.

There is need for an amplification of the legislative and executive aspects of the management process; plus some indication of the role of the political sphere in the management process. Government and political processes are central in fisheries management in most cases. The role of Government decision-making and where and when it fits in the sequence of fisheries management activities should be indicated.

There should be more emphasis throughout the document on the need for cooperation and consensus between the interested parties and the management organization concerned. In the best of cases, the fishery may be regarded as a form of joint venture between harvesters, the management organization, and the State or States that set it up.

More explicit reference should be made to chapter 17 of the UNCED Agenda 21 in the introduction. There should be a more substantial coverage of environmental issues.

End result of the Consultation

The formulation of these and other Guidelines was explained to be an ongoing process, meaning that the document is not subject in the immediate future to ratification. The Consultation noted the complexities and interlinked nature of the issues dealt with under this particular set of Guidelines, and noted that it was impossible to reformulate the Guidelines in the present meeting into a revised form. The important role of this Consultation in the five days available, was to identify areas omitted from the Guidelines, correct areas which are not desirable or feasible, and bring out different options where these are available and desirable for particular situations. Considerable new ground was covered during the Consultation which is reflected in the Working Group Reports.

Strategy for finalizing the Guidelines

The finalization of a revised version of the Guidelines should be greatly assisted by the Working Group Reports and a list of possible topics to be covered in the next draft is given in Annex 6. This finalization is recognized to be a substantial task requiring a small interdisciplinary team. A number of members of the Consultation suggested meeting during the forthcoming COFI meeting in Rome to further pursue this process. The e-mail addresses given for the attendees in Annex 1 will facilitate further consultation on this ongoing process in the meantime.

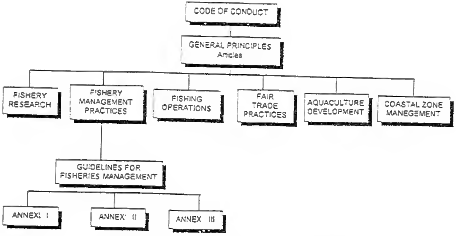

Figure 1. The content of the Guidelines for Responsible Fisheries Management, within the International Code of Conduct for Responsible Fisheries.

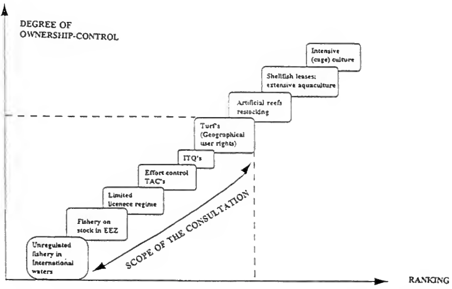
DEGREE OF OWNERSHIP-CONTROL
Intensive (cage) culture
Shellfish leases: extensive aquaculture
Artificial reefs restocking
Turf's (Geographical user rights)
ITQ's
Effort control TAC's
Limited licence regime
Fishery on stock in EEZ
Unregulated fishery in international waters
SCOPE OF THE CONSULTATION
RANKING

Figure 2. The proposed scope of the Guidelines for Responsible Fisheries Management, as discussed during the introduction to the Expert Consultation.

ANNEX 1

PARTICIPANTS

Dr. Robin Allen
(Chairman)
MAF Fisheries Policy
Ministry of Agriculture and Fisheries
Gillingham House
101-103 The Terrace
P.O. Box 2526
Wellington
NEW ZEALAND
Fax: 0064 4 4744 129
Internet:
ALLENR@POLRA.MAFQUAL.GOVT.NZ

Dr. Awie Badenhorst
Deputy Director
Sea Fisheries Research Institute
Department of Environmental
Affairs and Tourism
Private Bag X2
Rogge Bay 8012
Cape Town
SOUTH AFRICA
Fax: 0027 21 252920
email: badenhst@sfri.sfri.ac.za

Dr. John F. Caddy
Chief, Marine Resources Service
Food and Agriculture Organization
of the United Nations
Viale delle Terme di Caracalla
00100 Rome
ITALY
Fax: 00396 522 53020
email: john.caddy@fao.org

Mr. Ray Dobson
NZ Fishing Industry
Private Bag 24901
Wellington
NEW ZEALAND
Fax: 0064 4 385 2727

Dr. Richard J. Grainger
Senior Fishery Statistician
Fishery Information, Data &
Statistics Service Fisheries Department
Food and Agriculture Organization
of the United Nations
Via delle Terme di Caracalla
00100 Rome
ITALY
Fax: 00396 522 53020
email: richard.grainger@fao.org

Mr. Michael Hagler
Greenpeace International Fisheries
Campaign
P.O. Box 32153
Devonport
Auckland 9
NEW ZEALAND
Fax: 0064 9 445 2548
email: mike.hagler@green2.dat.de

Mr. John Kurien
Centre for Development Studies
Prasanthanagar Road
Ulloor
Thiruvananthapuram 695 011
Kerala
INDIA
Fax: 0091 471 447137

Dr. Yoshihiro Kuronuma
Senior Research Associate
Fisheries Management & Economy
Division
National Research Institute
of Fisheries Science, Fisheries Agency
12-4 Fukuura 2 chome
Kanazawa-ku, Yokohama-shi
Kanagawa 236
JAPAN
Fax: 0081 45 788 5001

Mr. Egil Lekven
Head of Division
Directorate of Fisheries
P O Box 185
N-5002 Bergen
NORWAY
Fax: 0047 55 23 8090

Mr. Michael Lodge
Legal Counsel
Forum Fisheries Agency (FFA)
Box 629
Honiara
Fax: 00677 23995
Phone: 00677 21124
SOLOMON ISLANDS
email: michaell@ffa.gov.sb

Dr. Robin Mahon
Fisheries & Environmental Consulting
48 Sunset Crest
St. James
BARBADOS
Fax: 001 809 432 7415

Mr. Phil Major
Director Fisheries Policy
Ministry of Agriculture & Fisheries
Gillingham House
101-103 The Terrace
P.O. Box 2526
Wellington
NEW ZEALAND
Fax: 0064 4 47441292

Dr. Arthur May
President and Vice-Chancellor
Memorial University of Newfoundland
POB 4200
Elizabeth Avenue
St. John's, Newfoundland
CANADA
Fax: 001 709 737 2059
Phone: 001 709 737 8212
Ex Asst - Email: ehillman@kean.ucs.mub.ca

Dr. Talbot Murray
Scientist, Research Center
Ministry of Agriculture & Fisheries
P.O. Box 287
Wellington
NEW ZEALAND
Fax: 0064 4 386 0572

Dr. Barry Pollock
Manager (Fisheries Services)
Department of Primary Industry
GPO Box 2454
Brisbane, Queensland 4001
AUSTRALIA
Fax: 0061 7 229 8146
Phone: 0061 7 22422430

Mr. Juan Carlos Rey
Principal Administrator
DG X1V, EEC
200 rue de la Loi
B-1049 Brussels
BELGIUM
Fax: 0032 2 296 6046

Dr. Michael P. Sissenwine
Senior Scientist for Fisheries
NMFS, NOAA
1335 East-West Highway
Silver Spring, MD 20910
UNITED STATES OF AMERICA
Fax: 001 301 713 2258
email: michael_sissenwine@ssp.nmfs.gov

Mr. Rolf Willmann
Fishery Planning Officer
Development Planning Service
Fishery Policy and Planning Division
Fisheries Department
Food and Agriculture Organization
of the United Nations
Viale delle Terme di Caracalla
00100 Rome
ITALY
Fax: 00396 522 56500
email: rolf.willmann@fao.org

ANNEX 2

AGENDA

I. Introduction/welcome to the meeting.

II. Discussion of the arrangements for the meeting.

III. An introduction to the Code of Practice for Responsible Fishing, and the draft Principles and Guidelines for Fisheries Management.

IV. General comment on document.

V. Agreeing on fisheries management objectives.

VI. Deciding on the fishery management framework.

VII. Formulating fisheries management measures.

VIII. Deciding on the criteria for stock rebuilding and resource enhancement.

IX. Setting guidelines for dispute settlement.

X. Guidelines for fishery monitoring, control and surveillance.

XI. Any other matters.

ANNEX 3

PROPOSED OUTLINE STRUCTURE OF REVISED GUIDELINES FOR RESPONSIBLE FISHERIES MANAGEMENT

1.0 Introduction/Background

1.1 Current problems and the need/importance of fisheries management.

1.2 Purpose of the document (relationship to UNCED and Code of Conduct).

1.3 How the document should be used.

1.4 Definitions.

1.5 Description of the organization of the remainder of the document.

2.0 Fisheries Management Concepts

2.1 A social contract - recognition that fisheries management applies to, and affects, people.

2.2 Technical basis of fisheries management, e.g.: concept of a production function, implications of access control, management units, fishery interactions, environmental costs of fishing production.

2.3 Objective and constraint

  2.3.1 Long-term and short-term considerations.

  2.3.2 Objectives, e.g. : biological, economic, social.

  2.3.3 Constraints, e.g. : transition problems, limits on the impact on the resource, indirect environmental affects.

2.4 Fishery management methods, e.g. : input controls, output controls, their advantages and disadvantages, refugia.

3.0 Elements of Fisheries Management

3.1 Fisheries management organization - consider which resources, the jurisdiction, who is governed, and overarching goals and principles.

3.2 Information to support fisheries management, e.g. : fisheries data, resource surveys, biological studies, conservation engineering (e.g. : TEDs), stock assessment, traditional.

3.3 Fisheries management decision processes.

- 3.3.1 Consultation with interested parties throughout.
- 3.3.2 Specifying objectives, constraints, reference points
- 3.3.3 Formulating management options, e.g. : management units, methods, specific value (such as a mesh size).
- 3.3.4 Making fishery management decisions.
- 3.3.5 Documenting the process and decisions.

3.4 Implementation

- 3.4.1 Writing regulations.
- 3.4.2 Documentation.
- 3.4.3 Communication.
- 3.4.4 Surveillance and enforcement.

3.5 Dispute resolution/settlement

- 3.5.1 Why important in fisheries.
- 3.5.2 Need to set up procedure.
- 3.5.3 Examples of types of dispute.

3.6 Monitoring performance

- 3.6.1 Performance measures.
- 3.6.2 Feedback to 3.1, 3.2, 3.3, 3.4, 3.5

Annexes

1. Components of Fishery Management Plan.
2. Surveillance and Enforcement.

ANNEX 4

REPORT OF WORKING GROUP I

Description of task

1. Working Group I met under the chairmanship of Dr. M. Sissenwine to consider the Guidelines from the perspective of those who are obliged to implement management at the technical level.

2. The Working Group first reviewed sections of the Draft Guidelines assigned to it, paragraph by paragraph, to see if the contents were generally acceptable, and if necessary, propose amendments, deletions or items which should be included. Editorial changes were generally not proposed. The Working Group stressed, however, that it is extremely important that the final document be understandable to the general public. The paragraphs reviewed in this way were: 1-27, 41-45, 48-49, 51-56, 60-89, 94-95, and 99-104. Some paragraphs and one box were redrafted.

3. The Working Group proposed a new structure for the document, and this was refined and agreed by the plenary session. Each paragraph was then considered in relation to the new structure and a proposal was made as to where each paragraph should be situated (this mapping, together with that of Working Group II, is shown in Appendix 6 to this Report).

4. The Working Group then reviewed the document as a whole, drawing some main conclusions, making recommendations, and identifying major omissions and areas which need strengthening. Finally, suggestions for additional annexes were made and outlines for three of these prepared.

Major Conclusions and Recommendations

5. The Working Group concludes that preparation of guidelines for responsible fisheries management is a daunting task because of the:

a) scope of the subject (including physical, biological, economic, social, political and organizational institutional sciences);

b) diversity of fisheries; and

c) rapid evolution of fishery management issues and approaches.

6. "Cookbook" style guidelines are not feasible and they would mislead users. A better approach is for the guidelines to provide a comprehensive framework to help organize ideas, planning and decision making, for application to specific fisheries.

7. While the draft guidelines reviewed by the Working Group contain much useful information, a new document (rather than revision of the existing draft) of the guidelines is needed. Useful sections of the current draft should be retained to the extent that they support a new document, but they should not be forced to fit. The Working Group's detailed critique of the current draft (attached) should help with this process.

8. In preparation of a new document, the Working Group recommends that:

a) The document be carefully written so that it is clear and understandable by the intended audience. An experienced "popular scientific writer" would be very helpful.

b) A new outline should be adopted. The Working Group's recommendation is included in the Consultation's plenary Report.

c) The definitions of "Fisheries Management", a "Fisheries Management Organization" and "Interested Parties" should be revised as indicated in the Working Group's critique.

d) Care be taken to assure balanced consideration of the diverse array of fishery types, including small scale, subsistence and recreational fisheries. The existing draft is geared toward industrial fisheries in developed countries.

e) The document should draw on, and direct the reader to, key literature on fisheries management, particularly FAO manuals. A mapping to key references, depending on the fishing situation and type of information (e.g. data), would be useful. Information in Annex I of the Draft Agreement prepared by the Chairman of the UN Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks may also be useful in the Guidelines.

f) Economic and social information and consideration should be addressed in the document. These are key elements of fisheries management which are under-represented in the current draft.

g) A "bottom-up" (i.e. community based) approach to fisheries management should also be addressed in the document. A prospectus on this topic was prepared by the Working Group (Appendix 1).

h) The document should provide guidelines on output controls (e.g. TACs) and allocation options. The latter should address allocation of individual rights, including (but not limited to) ITQs.

i) The document should not imply judgement about the "right" or "wrong" way of carrying out elements of fisheries management, when a technical basis or global consensus for such judgement is lacking. In such cases, it is appropriate to report on common practices.

j) The document should not unnecessarily restrict its scope by using terms like "marine" or "commercial fisheries" when the guidelines apply more broadly. On the other hand, the Guidelines are unlikely to do justice to inland fisheries (except large lakes). Other provisions are needed for Guidelines on inland fisheries.

k) The document needs to address the relationship between fisheries management and biodiversity. For example, the Working Group concluded (based on the limits of current understanding), that responsible fisheries management should be sufficient to protect the biodiversity of fisheries resource species. But the indirect effects of fishing on other ecosystem components may be more problematic. The Working Group prepared a prospectus on this topic (Appendix 2).

l) The document needs to provide an overview of stock assessment methods and a road map to key references (see recommendation e).

m) In addition to an overview of stock assessment methods, the document needs to address the broader research requirements for responsible fisheries management. This includes organizational and training needs. It should cross-reference the Code of Conduct and Guidelines for Fisheries Research.

n) The document should provide a broad framework for the decision-making process, including objective setting, input from interested parties, decision rules and documentation. A review (i.e. well documented case studies) would be valuable.

o) The document should consider options for fishery management performance measures, in relation to objectives and constraints. A prospectus on this topic was prepared by the Working Group (Appendix 3).

Paragraph-by-paragraph critique

9. Paragraphs 1 and 2 were considered generally acceptable.

INTRODUCTION

Definitions (Paras 3-4)

10. It was decided to retain the term "interested party" for the moment although some members preferred the term "stakeholder". One view was that the term "stakeholder" could be interpreted in a narrower sense to include only those with a financial interest in the resource.

11. It was proposed to modify the definition of "fisheries management" so as to remove the reference to the fisheries management authority controlling the interested parties in recognition of the need to assure the active participation of interested parties in management. The proposed version is as follows:

> *Fisheries management is the integrated process of information gathering, analysis, planning, decision-making, allocation of resources and formulation and enforcement of fishery regulations which govern the present and future fishing activities, in order to ensure the continued productivity of the resources.*

12. It was pointed out that more than one body may undertake the role attributed to the fisheries management authority. Further, the term "fisheries management organization", as used in the revised Code of Conduct principles, would be preferable. In the revised definition proposed, it was not considered necessary to specify the services for which the organization would be responsible as these are listed in the definition of fishery management:

> *Fisheries management organizations are bodies responsible for fisheries management, including making rules that govern fishing activities.*

13. It would be highly desirable to add examples of criteria which could be used for identifying interested parties. A revised definition of "interested party" was proposed which removes reference to the need for State acceptance, as follows:

> *The term interested party refers to any party whose interests are affected by fisheries management.*

14. Because fisheries management plans are not always explicit or even written down, an amended definition was proposed:

> *A fisheries management plan is an arrangement between the interested parties and the fisheries management organization which may include the objectives and means of management, the nature of the management organization, its powers and responsibilities, its working and consultation procedures, as well as the rights and responsibilities of the interested parties in the fishery.*

Geographical categories (Para 5)

15. Box 1 is considered potentially useful but is incomplete in that interested parties are missing for some of the categories and it does not take account of some less formal management arrangements. A proposed revised version of Box 1 is provided in Appendix 4. Paragraph 5 which introduces Box 1 is very confusing and a suggested alternative is as follows:

> *5. Fisheries management must deal with stocks which vary considerably in geographical distribution from highly localised, within an EEZ, to widely distributed across several EEZs and the high seas. In each case, the fisheries management organization and the interested parties should be clearly defined. Examples of the types of geographical distribution which may be encountered, the types of fisheries management organizations which may be required to manage them and possible interested parties are provided in Box 1. As shown, interested parties may include exploitative (fishing industry, recreational fishers) and non-exploitative users (conservation organizations, recreational divers) of the resource. Consumers may also be viewed as interested parties. Note that it is the level of representation rather than the type of interested party which varies among geographical stock categories.*

Implementation as legislation (Paras 6-7)

16. No suggestions for amending these paragraphs or Box 2 were made. It was agreed that Box 2 has substantial content but is misplaced here.

The area of competence of the fisheries management authority (Paras 8-10)

17. This section is mistitled and it confuses management units with areas of competence. It should be briefer, just stating that stocks should be managed throughout their ranges but that compromises often have to be made. It may be appropriate to merge paragraph 5 with these. A two paragraph redraft was prepared and is recommended as a replacement:

> *8. The geographical area of the fisheries management organization should cover the range of the stock(s) of fisheries resources being managed. Consultations should be entered into in cases where the area of competence overlaps (coincides with) areas of competence of other fisheries management organizations, or areas of national jurisdiction of States not party to the organization for the purpose of developing compatible management measures.*
>
> *9. Where information is considered to be insufficient for defining stock boundaries, appropriate research should be undertaken. In such cases, the fisheries management organization should ensure that existing management measures are consistent with the precautionary principle in Annex . These may include measures designed to protect the fisheries resource during periods when, or in areas where they are considered to be particularly vulnerable (e.g. during spawning, etc.).*

The structure and functioning of the fisheries management authorities (Paras 11-12)

18. This section is too detailed for an Introduction and most should be moved to later sections. It should simply be stated here what the main functions of the fisheries management organization are.

The right to fish (Paras 13-16)

19. Again with this section, it would be better to move the detail to another section. The right to fish must always be qualified by impacts on others parties and by environmental constraints. The Working Group believed many of the statements as presently phrased to be inaccurate, but this could be largely overcome by substituting "should be" for "is" throughout. UNCLOS is the basis for many of these statements and it might be useful to quote some of the relevant parts of UNCLOS in an annex for reference.

The need for resource management and criteria of effectiveness (Paras 17-18)

20. These paragraphs require editorial tidying-up and paragraph 17 should be strengthened and put near the beginning of the document. The phrase "rapid and precautionary response" is a contradiction in terms. Paragraph 18 should be moved to after the Setting of Management Objectives section and shortened. It would probably be sufficient to simply state here that monitoring is required and the consequences of doing nothing if management is way off target could be serious. Details should be provided later in the document. The criteria of effectiveness should also include economic and social elements.

THE SETTING OF MANAGEMENT OBJECTIVES

21. The Working Group recommended a major reorganization of this chapter.

General considerations (Paras 19-22)

22. This section should simply state the need for objectives, the general scope which they can take, the relationship to UNCLOS, and the role of interested parties in setting objectives.

Environmental factors, Economic factors (Paras 23-25)

23. These paragraphs should be deleted and the full range of possible objectives, currently dealt with in Box 3, should be covered in the main text. In this regard, only objectives which relate to the outcome of the fishery should be considered, whereas sectoral or political objectives should not. Therefore, political objectives should be dropped (this might be partially replaced by national objectives), social objectives should be added, and the objectives of small scale and industrial fishing sectors should be dealt with under economic and social categories. Likewise, it is useful to view environmental objectives for fisheries management as environmental constraints.

The broader context of coastal area management (Paras 26-27)

24. ICAM is not an objective but rather a means of minimizing conflict. It is a constraint and should therefore be considered in conjunction with Box 4.

25. The text in Box 5 refers to the table cell contents as being objectives whereas only some could be considered objectives, others are only consequences. Maximizing employment does not necessarily correspond to high exploitation; this is a common misconception. Whereas some of the objectives/consequences are social, none of the reference points are. Most important, it should be stated that reducing spending on effort can increase yield. The general point that management can lead to increased benefits should be brought out early in the Introduction chapter. Overall the Box is somewhat confusing and it would be better to incorporate mention of the reference points into the text concerning biological and economic objectives.

The framework for data gathering and fish stock assessment (Paras 41-45)

26. Data collection accounts for a very large proportion of the overall cost of fisheries management and is critically important for successful management, and data collection should be set in this context. It might be preferable to title this section something like "The scientific basis for fisheries management". The section should state that data needs should first be determined and priorities set for data collection. All of the data mentioned in paragraph 41 may not be required and it should be made clear that what is to be collected will depend on the needs of the particular management system.

27. Many manuals have been prepared on the collection of fishery data and somewhere in the Guidelines a comprehensive list of references to these documents should be provided. This section only mentions the collection of data on the fishery itself whereas the need for environmental data should also be considered.

28. The statement in paragraph 41 that data should be made available to interested parties should be strengthened by making reference to Agenda 21 where the right of access is clearly stated. However, it should be recognised that it may only be possible to obtain reliable data if certain confidentiality provisions are met and this may mean restricting the release of data in detailed form. Whatever the restrictions, all data used in stock assessments should be available on a need-to-know basis to all those involved in making the assessment, formulating the advice and making management decisions.

29. The appropriateness of referring to Figure 1 in paragraph 42 is doubtful. The second last sentence in this paragraph should read ".. and/or the economic performance of the fishery..".

30. The last sentence in paragraph 43 is too complicated and convoluted and requires rewording.

31. Paragraph 44 really only covers industrial fisheries. It needs to be broadened to cover small-scale, subsistence and recreational fisheries as well, and to recognise the usefulness of traditional knowledge for management.

32. The collection of rent from a fishery is generally not possible and so the reference to this in paragraph 45 should be stated as an option.

The framework for ensuring input of technical advice to management (Paras 48-49)

33. The reference to Figure 1 should be as an example of two common structures which are not necessarily the best ones. The management system will often be far less elaborate and can be just as effective provided the essential elements are there: a sufficient range of expertise, transparency, quality control on inputs, documentation, a characterisation of the uncertainty in the analyses, and performance evaluation of the management advice and management action. The Guidelines should emphasise these elements. This topic is important enough to merit the preparation of a case study on fisheries management systems around the world.

34. In item a) of paragraph 48, the peer reviews should be of all data and technical analyses and not the "work of individual government fishery biologists and economists", and the last line should be replaced with ".. experts representing the viewpoints of interested parties". The issue of peer review is closely linked to documentation and transparent processes.

FLEET SIZE AND EFFORT CONTROL

Effort control and the right to fish (Paras 51-56)

35. The fundamental problem with this section is confusion between access control which regulates investment in fishing capacity and effort control for the purpose of regulating fishing mortality on the stock. As these are two different control mechanisms undertaken for different purposes, it is recommended that this section be divided into two accordingly. It should be understood that these approaches are closely related (e.g. access control sets the upper limits to fishing effort).

36. The part dealing with access control should include discussion of ITQs which are also the subject of investment.

37. The part dealing with effort control could be combined with the sections dealing with technical measures, which are also concerned with controlling fishing mortality (sometimes selectively by size or species). That same section should also deal with TAC regulation which is virtually ignored in the present draft and needs to be greatly elaborated. References to relevant manuals are required (e.g. the FAO Technical Paper on Effort Regulation).

38. Throughout the whole document fishing capacity is discussed in terms of fishing vessels. This is far too restrictive and should be generalised to include recreational, inland and small scale marine fisheries which do not involve vessels. The term "fishing units" would be appropriate.

39. In paragraph 51 it should be stated that access control is essential for implementing a wide variety of management options, not just for reducing over-capacity.

40. Paragraphs 52 and 53 should be revised to stress the importance of access control and they should state that historical participation is usually taken into consideration when granting access. However, the reference to compensation for access denied should be deleted. The wording used should be like that in principle 6.6.3 of the Code.

41. Paragraphs 53 and 54 should state that effort standardisation is only possible for some gears and when deciding on its usefulness, managers should take note that the relationship between fishing effort and fishing mortality is complex, potentially variable with the environment and always evolving with technology. In spite of the complicating factors, there are many examples of where these standardizations are used for stock assessment; on the other hand their use for setting fish mortality levels for management has been rare.

42. The sentence in item a) of paragraph 55 after the word "occur" should be replaced by "means that it is essential to monitor effort in real time". Item b) is not relevant to effort control and should be deleted. Item c) is necessary but needs elaboration, and together with items d) and e), should be moved to the section dealing with capacity as three separate paragraphs.

TECHNICAL MEASURES (Para 60)

43. The term "reduce negative impacts" should be replaced by "control fishing mortality and promote sustainability". Box 6, referred to in paragraph 60, is useful in demonstrating the relationship between fishing mortality, gear efficiency and fishing effort. Item B in Box 6 should read "q: the efficiency and selectivity ...". Box 7, referred to in the same paragraph, is also illustrative but the tone of the notes in it consistently imply there is a problem to be corrected and this is not always the case. Also, it is written almost entirely for trawls and needs to be generalised. It is proposed that some additional items be included and these are listed in Appendix 5. Three further important points should be made either in Box 7 or paragraph 60: (i) no measures will be effective unless they have the support of the industry; (ii) refugia, *per se*, as distinct from closed areas, may be useful management measures for reducing fishing mortality; and (iii) areas where juvenile fish occur are often only be defined very imprecisely and so rapid adjustment of closed areas can make these measures much more effective.

Gear interactions and characteristics (Paras 61-62)

44. This section is misplaced and should be moved to the end of the Technical Measures chapter as it is not a technical measure. In its place, two new sections are required dealing with effort control (some text to come from previous chapter) and catch quota control (entirely new). A further section should be prepared on environmental impacts of fisheries and these should go into section 2.2 of the new outline.

Size limits and mesh sizes (Paras 63-68)

45. It should be pointed out that new measures such as mesh size increases are more difficult to introduce the more overfished the stock becomes because the average size of fish decreases.

Managing multispecies resources (Paras 69-71)

46. It should be made clear that multispecies management concepts are still under development. Management of multispecies fisheries will inevitably require compromises for fishing mortality, with some species being over-exploited and others under-exploited.

47. The practice of taking account of food requirements of predators is still not well developed but the application of trophic model management coupled with precautionary approaches has led to some advances.

Closed areas or seasons, and conservation of biodiversity (Paras 72-75)

48. It should be pointed out in paragraph 72 that season or area restrictions on fishing may be introduced to protect species other than those which are the target of fisheries. Closures may be to protect environmentally sensitive areas, prevent conflicts between gears or to prevent local depletion of non-target species. Regardless of the purpose of the closure, it is likely to reduce fishing mortality.

49. Paragraph 74 should include a statement that marine parks should be designed according to their purpose (e.g. to protect species diversity or enhance stocks).

50. Land-based effects are only generally more pronounced than the effects of fisheries in inshore areas, and so at the end of the second sentence in paragraph 75, the following should be added: "in inshore areas and semi-enclosed seas".

51. It would be preferable to have all items dealing with biodiversity in a section of their own. With regard to the effect of fishing on biodiversity, the Guidelines should acknowledge that fishing does alter biodiversity and should state something like "fishing must not be allowed to jeopardise the functioning of the ecosystem". To this end, fisheries management should ensure that monitoring of non-fished as well as fished species is undertaken. It should be pointed out that a cessation of fishing will not necessarily result in the ecosystem returning to its virgin state.

THE FORMULATION OF MANAGEMENT MEASURES

FISHERY STATISTICS AND RESOURCE MONITORING

Data collection (Paras 76-82)

52. The paragraphs in this section are taken from the report of a Consultation held in La Jolla in 1993, slightly modified, and should be referenced.

53. This section should start with a description of what purpose various data are required for, i.e. stock assessment, economic analysis or regulatory purposes.

54. A general comment about this section was that it contains too much detail. The detail should be removed and replaced with a list of references to manuals, handbooks and guides with annotations identifying what each reference document would be useful for. In addition to the section on fishery statistics, another dealing with resource monitoring should be included, and this too should contain an annotated list of references. It should be pointed out that in the absence of data on the fishery, resource monitoring through fishery-independent data is all the more important. Also, the term fisheries management organization should be applied throughout this section so as to be consistent with the rest of the document. A further section on social and economic data is required.

55. Paragraph 78 is too orientated towards the needs of global reporting and not those of the fisheries management organization.

56. It would be preferable to move paragraph 77 to later in the section.

57. Mention of the need for effort standardisation should be included in paragraph 80. The reference to "fish and non-fish" should be deleted.

58. Biological data are not essential for stock assessment as stated in paragraph 81, but rather highly desirable.

59. The contents of the vessel register described in paragraph 82 are tailored mainly to MCS. More elements (e.g. engine power) should be included for stock assessment needs.

Confidentiality and verification of data (Paras 83-85)

60. The word "ensure" should be replaced by "encourage reliable reporting of data" in paragraph 83.

Timeliness of the submission of data (Paras 86-88)

61. Real time data are not required for all fisheries under management as stated in paragraph 87, but primarily for quota management when catch rates are high or variable or for effort control when effort is high or variable.

62. In paragraph 88 it should be stated that delays in providing and analyzing data for stock assessment can be a major source of uncertainty.

Costs of collection, collation and dissemination of data (Para 89)

63. The words "high seas" should be deleted in paragraph 89. This paragraph should be elaborated.

64. A substantial omission is a section describing stock assessment methods including the use of qualitative information for stock management when quantitative data are lacking. This section would also contain an annotated list of references to publications providing detailed methodology.

MANAGEMENT APPROACHES

The role of fisheries research (Paras 94-95)

65. The research needed is determined by the management systems employed, and the possibilities for management are constrained by the research support available.

66. A cross reference to the Fisheries Research Guidelines should be made in this section. The types of research which should be undertaken in support of fisheries management should be listed; these are fisheries biology, stock assessment, trophic interactions, conservation engineering, biodiversity, ecosystem monitoring, hydrography, and socio-economic studies. References to documents providing detailed guidance on these areas of study should be provided. The need to maintain long term continuity in statistics and resource monitoring must be stressed. Developing countries can benefit from regional pools of expertise to provide guidance and training.

Decision-making process (Para 96)

67. This paragraph is inadequate and should be a well-developed section describing a variety of decision-making processes. Box 8 should be dropped as it stands because the methods discussed in it are not yet fully operational. The Box might be replaced by a flow chart showing how management decisions can be made.

STOCK REBUILDING POLICIES AND RESOURCE ENHANCEMENT (Paras 99-100)

68. In Box 9, the words "orders of magnitude should be removed from the table title, and an "X" should appear against large pelagic fish for 10-15 years.

69. It was decided to exclude the arbitrary standard proposed in Box 10 for selecting fishing mortality for stock rebuilding. The rest of the text should be retained but it should be made clear that a reduction in fishing capacity is not essential for stock rebuilding, provided effort is curtailed. However, without capacity reduction fishing may not be viable.

Some future priorities for fisheries management and stock rebuilding (Paras 101-102)

70. The words "*de facto*" should be deleted in paragraph 101. The last sentence of the paragraph should be deleted and replaced by a statement that stock rebuilding measures will be called for.

71. In paragraph 102 the word "redimensioning" should be replaced, and the reference to groundfish stocks is too restrictive and should be removed. In item a), it is not generally true to say that fishers are stewards for the resources, and this item should be deleted. The last sentence of item b) should be rephrased to say that various schemes can be used to reduce capacity. The references to the arbitrary criterion should be deleted under items c) and d), and it should be stated that technical measures may be used in addition to direct effort reduction. Item e) is out of place here and should be moved elsewhere.

72. The same paragraph should state that fleet capacity reduction is not essential for stock rebuilding, but that it is generally important for rebuilding an economically-healthy fishery, and that capacity reduction also has a social cost. Vessels removed from one fishery may transfer the problem to another.

Resource and habitat restoration and enhancement (Paras 103-104)

73. The title of this section should be changed to "Habitat restoration and resource enhancement". Nothing on resource enhancement appears in this section and this should be included. Much resource enhancement has taken place in Japanese coastal waters and that experience can be drawn upon.

74. In paragraph 104, nursery areas should be included in the list of habitats which could be protected.

APPENDIX 1 to WG I Report

PROPOSED KEY ITEMS FOR A NEW ANNEX: COMMUNITY BASED FISHERIES MANAGEMENT

To give some assistance to the FAO Guidelines for Responsible Management of Fisheries in relation to a small scale coastal fisheries management, particularly with regard to community based fisheries, it is suggested by the expert to create additional new Annex in order to obtain a balance of documents as the Guidelines. Title of the Annex would be, for example "Community Based Management as an option for a small scale coastal fisheries".

1. Definition of the community based fisheries management (CBFM)

Unified definition may be required which would be applicable to both developing and developed countries. It also seems important to have clear definitions of co-management (CM) as well as self-management (SM).

From an institutional viewpoint, for example, SM may be considered as totally self-imposed voluntary management without any legal coverage, and CM may be a management to be practised by fishermen (and/or fisheries organization) and government together. Both SM and CM may be considered under a category of the CBFM in such case.

<——————————————————>

e.g.: SM CM Institutional Management

<——————————>

CBFM

2. Identifying management patterns

It is crucial to identify patterns of management in order to find out each management exact characters. The pattern of the CBFM may include "bottom-up" and/or "top-down" types

For example, SM is usually a customary arrangement for fisheries management and this may eventually become legally valid in some cases, and such case can probably be referred as "bottom-up" patterns of the CBFM.

3. Importance of specific objective behind the CBFM measures

There seem to exist different measures to be applied for the CBFM with specific objectives. Therefore, clear comprehension of the specific objectives behind the CBFM measures is essential.

In Japan, for example, it has been recognised six different general measures for the CBFM, and some of the general objectives behind these measures are to find optimal solutions for related communities as well as to improve irrational part of highly developed coastal fisheries. The six types of general measures that address management of fishing grounds, fisheries markets, over capitalization, stock enhancement, mariculture, and reproduction.

4. Source of motivation for the CBFM

It seems that a most important key element is how fishermen and/or community would get their motivation for self- and/or co-management. Then, source of their motivation would be a core in order to understand the CBFM.

5. Data/information, and its collection

In order to identify and to examine above mentioned and other issues, it may be important to obtain reliable data/information oriented with communities and resources.

5.1 Community oriented data/information

This type of data/information would be required to ensure sustainable community from a view point of both fishermen as well as a government. This includes economic, historical, sociological, religious, philosophical etc data information (eg: historical/empirical process and consequence of the CBFM development).

5.2 Resource oriented data

This type of data may be required to keep sustainable utilisation of resources by communities from a view point of both fishermen as well as a government.

5.3 Collection of data/information

(for 5.1)
- by interviewing fishermen and/or fisheries organizations
- by historical examination
- by literature review, socio-economic statistics etc

(for 5.2)
- catch, catch effort etc from fishermen

(- a separate resource estimation may be required from a governmental viewpoint)

Following lists are some references to be used to consider the Guidelines

(1) June 92 (Kobe) FAO Conference
"Development of Community Based Coastal Fishery Management System for Asian and Pacific"

(2) Nov 93 (Thailand) FAO Conference

a) "Socio-economic Issues in coastal Fisheries Management: Proceedings of the IPFC symposium held in conjunction with 24th IPFC"

b) "Bibliography"

(3) OECD Fisheries Committees

a) September 1994 8th session of Ad Hoc Expert Group on Fisheries Country Report
b) February 1995 9th session of Ad Hoc Expert Group on Fisheries Issues Papers

(4) South Pacific Commission and South Pacific Forum Fisheries Agency reports.

APPENDIX 2 to WG I Report

PROPOSED KEY ITEMS FOR A NEW ANNEX: BIODIVERSITY CONSIDERATION IN FISHERIES MANAGEMENT

- Definition of biodiversity (from the Biodiversity Convention, e.g. Article 7 and others)
- Overarching principles related to extractive processes (from the Biodiversity Convention, e.g. Article 7 and others)
- Identify linkages between biodiversity and fishing (eg: changes in genetic diversity, trophodynamics, habitats, etc.)
- Identify elements of fisheries management which can be used to maintain biodiversity (eg: precautionary approach, multispecies management, refugia, etc.)
- Incorporate measures to evaluate biodiversity related impacts in fisheries management
- Adopt or develop indices of ecosystem integrity and biodiversity which can be incorporated into fisheries management decision-making processes
- Adapt specific parts of Biodiversity Convention to fisheries management
- UNCLOS Article 119(1b), 61(2) and 61(4) should be elaborated in context of biodiversity
- CITES, IUCN World Conservation Strategy, UNCED Agenda 21 and other documents need to be consulted for appropriate material

APPENDIX 3 to WG I Report

PROPOSED KEY ITEMS FOR A NEW ANNEX: WHAT SHOULD A REVIEW OF THE ACTIVITIES OF A FISHERIES MANAGEMENT ORGANIZATION TAKE INTO ACCOUNT?

- Were the objectives set feasible and attainable?
- Did the implementation of management measures take proper account of all the constraints?
- Was there adequate consultation and communication with all interested parties?
- Was there appropriate time-scheduling to allow for timely actions?
- Was the mechanism for providing a flow of advice sufficient?
- Were relevant and applicable methods used in assessments (according to peer review)?
- Were all aspects of the assessments done with satisfactory rigour (e.g. peer review)?
- Were the objectives met? If not, for what reasons?

APPENDIX 4 to WG I Report

PROPOSED REVISED VERSION OF BOX 1

BOX 1: EXAMPLES OF POSSIBLE FISHERY MANAGEMENT ORGANIZATIONS AND INTERESTED PARTIES FOR DIFFERENT GEOGRAPHICAL CATEGORIES OF RESOURCES

Geographical Category of Resource	Fisheries Management Organization	Possible Interested Parties
High Seas Stocks (occurring entirely or largely on the high seas)	Multinational fishery organization, Joint standing commission (agreements between coastal and DWF nations)	Government Departments for coastal and DW states, National Representatives of Industry and Fishers International Conservation NGOs
Straddling and Highly Migratory Stocks (distributed or migrating across EEZ boundaries and onto the high seas)		
Shared Stocks (distributed or migrating across two or more EEZs)	Bi(multi)lateral agreement, Joint standing commission	Government Departments for coastal states, Industry representatives, Fisher and sportfisher associations, National Conservation NGOs
National stocks (widely distributed throughout the EEZ and exploited by several communities or companies)	The Minister of Fisheries, National FMO and its Advisory bodies, Multisectoral organization (e.g. a National CZM Organization)	National Government Departments (e.g. Fisheries, Environment, Tourism, Physical planning) Provincial, Prefectural, State Government Departments (for Federated States); Commercial and sportfishers and associations National or regional conservation NGOs
Local stocks (circumscribed distribution and exploited by one or a few communities)	Community-based Fisheries and/or Multisectoral Committees (e.g. a CZM Committee)	Regional/Municipal Government Departments, Individual fishers or community representatives, sportsfishers, Local, or local chapters of, conservation NGOs

APPENDIX 5 to WG I Report

SUGGESTED ADDITIONS TO BOX 7

Controls on F (Vector by age)

A.1 Effort limits (e.g. number of days by category)

Need estimates of age update routinely (sensitive to many factors)

New technology makes monitoring (f not F) easier for some types of fisheries (eg: high seas)

May be particularly useful for multispecies

A.2 TAC
- even more routine assessment
- enforcement often more problematic than f control

A.3 Effort and TAC control may be combined

B. Discarding (con) Easy enforcement (pro)

C. Gear restrictions (generalise - not just trawl mesh size)

C.1 To effect selectivity

Will layer mesh trawls may be more efficient, not true for all gear types

May lose some valuable catch in multispecies fishery, must compromise

May be imprecise (still catch small fish)

C.2 To reduce / limit q

Generally cannot calculate effect in advance

Economically problematic

Easy to implement

May require picking winners and losers

D. Controls on area/season

D.1 Selectivity

Generalize table ... not only trawls

D.2 Catchability

APPENDIX 6 to WG I Report

SUGGESTED LOCATIONS OF DRAFT GUIDELINE PARAGRAPHS IN PROPOSED OUTLINE

Paragraph	Working Group I Outline Section (if retained)	Working Group II Outline Section
1	1.2	1.2
2	2.1	1.2
3	1.4	Delete
4	1.4	Delete
5	1.4 }	
6	1.4 }	1.2 or 1.3
7	1.4 }	
8	3.1	3.1
9	3.1	3.1
10	3.1	Delete
11	3.1	3.2
12	3.3.3	3.3.5
13	3.1 }	
14	3.1 }	2.1
15	3.1 }	
16	3.1}	
17	1.1	Delete
18	3.5.2	Delete
19	2.3 }	
20	2.3 }	2.3
21	2.3 }	
22	2.3 }	(delete Art 6.1 references) 3.4.3
23	2.3.3	2.3.2
24	2.3.3	3.1
25	2.3.3	2.3
26	2.3.3	2.3
27	2.3.3	2.3
28	3.1	Delete
29	3.1	1.0
30	3.1	1.0
31	3.1	1.0
32	3.1	3.4
33	3.1	3.4
34	2.3	3.4 delete boxes
35	2.1	2.1
36	2.1	Delete
37	2.4 }	
38	2.4 }	2.4
39	2.4 }	
40	2.4 }	
41	3.2]	

42	3.2]	
43	3.2]	Not considered
44	3.2]	
45	3.2]	
46	3.4.4	3.4.4
47	2.4	2.3.2 / 2.3.3
48	3.1	3.2 / 3.3.4
49	3.1	3.2 / 3.3.4
50	3.1	3.1
51	2.4 }	
52	2.4 }	
53	2.4 }	Box or Annex
54	2.4 }	
55	2.4 }	
56	2.4 }	
57	2.4	2.4
58	2.4	2.4
59	2.4	2.4
60	2.4]	
61	2.4]	
62	2.4]	
63	2.4]	
64	2.4]	
65	2.4]	
66	2.4]	
67	2.4]	
68	2.4]	
69	2.4]	
70	2.4]	Not considered
71	2.4]	
72	2.4]	
73	2.4 }	
74	2.4 }	
75	2.3.3]	
76	3.2]	
77	3.2]	
78	3.2]	
79	3.2]	
80	3.2]	
81	3.2]	
82	3.2]	
83	3.2 }	
84	3.2 }	3.2
85	3.2 }	
86	3.2]	
87	3.2]	
88	3.2]	Not considered
89	3.2]	
90	3.1	2.1
91	3.1	3.5
92	3.1	3.3.1
93	3.1	Delete
94	3.2]	Not considered
95	3.2]	

96	3.3	3.3
97	3.5.2	3.5 / 3.1
98	3.5.1	3.5 3.1
99	2.4]	
100	2.4]	Not considered
101	2.4]	
102	2.4]	
103	2.3.2]	
104	2.4]	
105	3.3.1	Delete
106	3.3.1	New heading 3.4 bis
107	3.4.4	2.2 / 3.5.1 / 3.4.4 + New Annex

ANNEX 5

REPORT OF WORKING GROUP II

Introduction

1. The objective of Working Group II was to review the draft Guidelines from the perspective of fisheries managers and users of the resource. The Working Group also considered whether the use of the Guidelines could make a contribution to the management of the fisheries sector and how the Guidelines could be restructured and improved. The Working Group was coordinated by Michael Lodge. In presenting its report the Working Group identified certain key areas of the Guidelines which needed to be substantially revised. These are set out in Appendix A to this Report.

General comments on the draft guidelines

1. The Working Group noted that the draft guidelines present one particular management approach, i.e. hierarchical, top-down and oriented towards industrial fisheries, which might not be desirable or applicable in all instances. The guidelines should discuss various alternative management concepts and approaches and offer flexible definitions to account for a diversity of natural conditions, kinds of fisheries and socio-political and economic situations and for their dynamic and changing nature. It was also observed that the guidelines are directed at governments as well as private and non-governmental entities (to be reflected in section 1.2 of the revised outline)

2. The Working Group observed that the basis and purpose of the guidelines need to be clearly stated in the introductory chapter (1.1 and 1.2 of revised outline) and reference needs to be made to basic international legislation (UNCLOS) and international agreements (UNCED) and their relationship to the Code of Conduct.

3. The Working Group offered the following redrafting of paragraphs 1, 5 to 7 and 17 of the draft Guidelines which could become part of sections 1.2 and 1.3 of the proposed revised outline of the guidelines:

A. The purpose of these Guidelines is to assist fisheries managers in the practical application of the Principles of the Code in a specific fishery management context. The Guidelines provide technical qualifications to the relevant Principles of the Code which may help in deciding how the Principles may be applied within the fisheries management process.

B. These Guidelines have been formulated in a general context and are designed to be used at the discretion of fisheries managers with appropriate modifications of terminology and emphasis according to the specific context in which they are to be applied. The Guidelines are not intended to be legally binding, but may be given legal force in whole or in part, depending upon the circumstances in which they are applied.

C. In the practical application of these Guidelines, whether or not they are given legally binding effect, it will be necessary for the relevant fisheries managers to define key terms used in the Guidelines more explicitly as well as to determine which of the Principles of the Code are relevant in the geographical, jurisdictional and biological circumstances of the fishery and the weight to be given to each relevant Principle. The first step in any fishery management process is to determine the parties having a legitimate interest in the conservation and management of the living marine resources in question, the nature of that interest, and how that interest is to be taken into account in the fishery management process.

D. In accordance with the principles stated in [Article 3] of the Code, these Guidelines are to be interpreted and applied in the context of and in a manner consistent with the relevant provisions of the 1982 United Nations Convention on the Law of the Sea ("the Convention") and the other international instruments referred to in [Article 3].

4. The Working Group recommended that the guidelines discuss in a balanced fashion utilization and conservation objectives. The benefits derived from utilization of the resource need to be explicitly stated.

Terminology and definitions

5. The Working Group advised that the terminology and definitions applied in the guidelines need to be consistent with the principles of the Code of Conduct and that rights, interests and representation of interests need to be clearly distinguished (e.g in para 8 of the draft Guidelines). The term "interested party" is generally supported by the Working Group but the proviso that it be in all instances formally accepted by the State is unwarranted (1.4 of the revised outline).

6. The description of the competence of a fisheries management authority in paragraphs 8 & 9 of the draft guidelines were considered imprecise and inadequate. The term 'jurisdiction' is used on one hand in reference to a geographic area and on the other in a wider jurisdictional sense (3.1 of the revised outline).

The structure and functioning of the fisheries management authority

7. The concept of a singular management authority/body responsible for management may not always apply because different management functions may be performed by different agencies and because the management structure may be decentralised and comprise several lower level decision-making units (3.1 of the revised outline).

8. Interested parties should be involved in the acquisition and derivation of management information as they often have the most accurate and holistic information on resources abundance and other aspects of the fishery (para 11 of the draft Guidelines). However, concern was expressed that fishermen and the fishing industry may intentionally provide faulty or incomplete information (to be discussed in 3.2 of the revised outline whose title should be broadened, e.g. information requirements).

9. The Working Group supported the concept of formal documentation of agreed upon management objectives, regulations, etc. but this may not in all instances be done in the form of a management plan (3.3.5 of the revised outline).

The right to fish

10. The Working Group noted that a principal requirement is for the State to identify, analyze and recognize existing (including traditional) rights to the resource prior to modifying them or establishing or conferring new rights (para 13 of the draft Guidelines). It also observed that a distinction needs to be drawn between rights of States and of individuals. Rights may need to be prioritized (hierarchy of rights) and they may be made conditional on certain requirements (e.g. in Norway certain rights are only provided to active fishermen). These issues need to be considered in section 2.1 of the revised outline.

Management objectives

11. The Working Group recommended that management objectives be discussed early on in the guidelines as indicated in the revised outline (2.3). The principal biological, economic and social objectives need to be discussed in the main text rather than in a box (box 3 of the draft guidelines contains inappropriate value judgements and erroneous assumptions in (iii); (iv) and (v)). Objectives

need to find agreement and support by the various interested parties including fishers and the fishing industry. Trade-offs between competing objectives are the norm rather than the exception and require careful balancing and, if possible, re-conciliation. The impact of the pursuit of certain macro-economic objectives (e.g earning of foreign exchange) on the fisheries sector need to be carefully assessed in setting management objectives.

12. The Working Group advised that conservation needs to be included as an explicit objective of management. The costs of achieving conservation cannot in all instances be charged to the fishing industry or the fisheries sector because it reflects a societal objective. This would be in line with calling for a users' or beneficiaries pay principle. The narrow concept of inter-generational equity as presented in para. 16 of the draft Guidelines is untenable. Sustainability itself presupposes that future generations will also be able to derive benefits from the resources.

Paragraph-by-paragraph comments on the draft Guidelines

13. Paragraphs 1, 5-7, 8, 9, 11, 13-16 of the draft Guidelines: refer to paragraphs 3, 5, 6, 8 and 10 of the above text for comment.

The need for resource management and criteria for effectiveness

14. The Working Group observed that the contents of paragraphs 17 and 18 of the draft Guidelines do not fit the revised outline of the guidelines.

Management objectives

15. In reference to paragraph 19 of the draft guidelines, the Working Group observed that in many instances over-exploitation and over-capitalization are the result of faulty or absent incentive structures. The incentive structure is often governed by the nature of rights of the participants in the fishery. The less stable and certain these rights are the greater is the likelihood that short term interests outweigh long term objectives including resource conservation. In this connection the issue was raised how an appropriate incentive structure could be established for high seas fisheries, if at all. Open access was clearly identified as not providing any kind of incentive for self-management (to be considered in 2.3.2 and 2.3.3 of the revised outline).

16. The Working Group suggested that all reference to UNCLOS Article 61 should be deleted in paragraph 22 of the draft Guidelines. The remainder needs redrafting to include the requirement for fishermen/fishing industry to be knowledgable about fisheries management regulations which may call for adequate communication and training (3.4.3 of the revised outline).

Environmental factors

17. Paragraph 23 of the draft Guidelines needs to be expanded to explain the nature of "environmentally friendly" and placed into 2.3.2 of the revised outline. COFI/93 Inf. 8 may provide appropriate text.

Economic factors

18. The first sentence of Para 24 of the draft Guidelines is faulty because it omits resource rents. The requirement for the interested parties to pay for management costs needs to be qualified (to be discussed in 3.1 of the revised outline).

19. In reference to paragraph 25 of the draft Guidelines (see also 26), the Working Group felt that where subsidies are provided these need to be made explicit and shown in relation to the objectives they are intended to achieve (2.3 of the revised outline).

Coastal area management

20. The first part of paragraph 26 of the draft Guidelines should be presented in a box together with paragraph 27. The last two sentences of paragraph 26 provide an erroneous picture and should be deleted.

The management framework

21. Paragraph 28 of the draft Guidelines should be deleted.

22. The ideas presented in paragraphs 29 to 33 of the draft Guidelines are supported but the text needs to be placed in the appropriate new structure: paragraphs 29 to 31 of the draft Guidelines should become part of 1.0 of the revised outline, and paragraphs 32 and 33 of the draft Guidelines part of 3.4 of the revised outline.

23. The contents of paragraph 34 is supported but the reference to and contents of box 5 should be deleted. The latter contains inconsistent information.

The allocation of fishing rights

24. Para 35 of the draft Guidelines is too preacherly (moral values are not warranted in the guidelines but specific examples could be presented in a box of how States went about certain management aspects, e.g. protection of rights of indigenous people).

25. There is the need to distinguish between claims and rights whereby the latter presupposes legitimacy. Claims and other (traditional) rights may under certain circumstances be in conflict with management objectives. Stability of rights/tenure will encourage sustainable resource use. (Ideas to be reflected in 2.1 of the revised outline).

26. Paragraph 36 should be deleted as it contains debatable statements and does not provide much guidance. The idea carried in the last sentence could be presented in a box with the help of a specific example (2.4 of the revised outline).

27. The ideas presented in paragraphs 37 to 40 of the draft Guidelines should become part of section 2.4 of the revised outline. Examples of specific management techniques should be presented in boxes or Annexes. The discussion of ITQs in paragraph 37 needs to be placed in section 2.4, i.e. management methods, of the revised outline. In the last sentence the term 'management authority' should be replaced by 'State'.

28. The title of paragraph 39 of the draft Guidelines is wrong because the text deals with area specific fishing licences. The TURF concept needs to be discussed in section 2.4 of the revised outline, i.e. management methods, of the revised outline. In the same paragraph, the last three sentences need redrafting because 'open licences' could be desirable under certain circumstances.

Monitoring of compliance

29. The document offers too little guidance as to how rules and regulations should be enforced and how enforcement aspects are linked to the kind of management system selected. This should be covered in section 3.4.4 in the revised outline and in an Annex on enforcement.

30. The present text of paragraph 46 of the draft Guidelines is only applicable to industrial fisheries and additional text needs to deal with artisanal/small-scale fisheries. With regard to the latter, the roles of peer pressure, and moral norms and values in compliance need to be addressed.

31. The by-catch and discard issue also addressed in Paragraph 46 of the draft Guidelines requires much more detailed discussion especially in view of ecological/environmental interests. It is highly desirable to collect information on the level of discards by-catch and to introduce codes of conduct for fishermen to deal with discards and by-catch. There is a need to introduce the concept of "minimization" of by-catch and discards through appropriate measures including gear, and seasonal and area regulations. These aspects would relate to environmental objectives or constraints to be dealt with in section 2.3.2 and 2.3.3 of the revised outline.

Technical Advice to Management

32. With reference to paragraphs 48 and 49 of the draft Guidelines it was considered that more precise references need to be made to:

(a) Traditional, indigenous, local fishers knowledge should be taken into account in management discussions and decisions. However, this type of information should be reasonably verified to ensure its reliability.

(b) Scientific information is of primary importance in fisheries management. The use of scientific information in fisheries management should be an "open process". Peer review of scientific information is advisable. Some elaboration of the term "open process" is needed.

33. A description of the information input is needed under items 3.2 and 3.3.4 of the revised outline.

34. Paragraph 48 of the draft Guidelines needs a rewrite. It needs an inter-disciplinary approach including input of a wide range of views. Separation needed of economic and social aspects. Paras (b) and (c) are inappropriate as they deal with decision making processes.

35. Since words like "equitable", "arbitrary", and "rights" are open to interpretation and value judgements, a better approach might be build around the idea that allocation of access to the fishery should be dealt with by a management authority, and a process, which involved the individuals having an interest (or their representatives). The process itself and the management authority which organises it would then achieve legitimacy, lessening the opportunity for inequity and removing the opportunity for arbitrary decisions to be made on the extinguishment of rights.

36. Figures 1(a) and 1(b) need to be deleted and replaced by flow charts of specific examples of management regimes.

Annex 1 and 2

37. Remove Annex 2 (historical information is presented here which has not been accepted by UN Conference). Refer to FAO publication on reference points in the Guidelines.

38. Annex 1 requires substantial revision. It should contain a list of the basic components of a fishery management plan. The main body of the guidelines may contain a description of the circumstances in which a fishery management plan may be useful. For this purpose, useful material is contained in the second paragraph on page 39 and the second paragraph on page 40 of draft guidelines.

Coordination between states

39. The essence of paragraph 50 of the draft Guidelines would be reflected in the introductory chapter of the revised outline. The concept of cooperation between management agencies needs to be covered in 3.1 of the revised outline.

Fleet size/effort control

40. With reference to paragraphs 51-56 of the draft Guidelines, these refer to particular examples of management techniques. Should cover the wider range of effort controls (see FAO publication) - should be put in an Annex or Box (2.4 of the revised outline). Consideration needs to be given on how this may apply to artisanal and sport fisheries. (Some FAO publications cover some of this.) Use of the term "inequitable" to effort allocation is inappropriate.

Fleet redimensioning

41. A more general heading should be used to cover reducing quotas and reducing effort in paragraphs 57-59 of the draft Guidelines. When effort is to be removed from a fishery it is important to note the difference between removal of "real" effort and removal of latent effort. Compensation/rehabilitation does have a role in some cases of quota/effort reduction. The structure for paras 51-75 would best be given under

(a) Input controls
(b) Output Controls

and put in 2.4 of the revised outline.

42. Need to give examples of input/output controls and discussion of benefits as well as strengths weaknesses of each. A box or Annex on control measures is suggested. Examples of "controls" in fisheries management are numerous and include the following:

- TURFS
- Taxes
- ITQs
- Areas
- Specific fishing rights
- Effort controls
- Community based fishery management

Data collection (confidentiality and verification)

43. The key issue in paragraphs 83-85 of the draft Guidelines is the need for early understanding and agreement by all interested parties about

- level of access to data on fisheries;
- level of confidentiality;
- how information/data is to eventually be used.

44. There is a need to validate and verify information prior to its use in fisheries management. This section should refer to sport fishing, artisanal fishers and "anecdotal information" from fishers. This issue fits in section 3.2 of the revised outline.

Management approaches

45. Although management authorities have a general duty of care in carrying out their functions, it is not appropriate to present this in the document as a quasi-legal duty in paragraph 90 of the draft Guidelines. There needs to be a general statement of the responsibility of the management authorities to achieve a balance between the nature and integrity of the resource and monetary and non-monetary benefits to people and this needs to be placed near the beginning of the document outline (possibly 2.1 of the revised outline). The emphasis should be on the development of an integrated decision-making and policy process. The balance to be achieved is essentially sustainable development in the sense of a continuous process of decision-making guided by a basic philosophy which emphasizes development to improve the quality of life for people while remaining environmentally appropriate, making proper use (and sometimes non-use) of living marine resources.

46. Paragraph 91 of the draft Guidelines contains an important concept and should be put under 3.5 of the revised outline. There needs to be transparency and accountability by "publishing" a status of the resource report. Circulation of such a report to interested parties is highly desirable.

47. Paragraph 92 of the draft Guidelines could fit into the new outline under section 3.3.1. Fishers have a responsibility to respect regulations and provide information. Delete last sentence of paragraph 92 of the draft Guidelines.

Precautionary approach/principle (another consultation is to look at this)

48. The statement of the application of the precautionary approach in paragraph 93 of the draft Guidelines should take account of the balance between the resource and people. This approach translates to benefits/constraints on people (both short and long term). In some cases its application results in a decision between the resource and people's welfare.

49. Box 8 is beyond what is achievable (drop or amend). Models can be useful tool only. Care must be taken to recognise their limitations. Decision rules/trees can be useful in making decisions in fishery management. There is a need to provide advice on the decision making process for example by a flow chart. The flow chart could:

- Document the process
- Indicate timing
- Recognize expertise
- Take account of risk assessment.

An example of such a flow chart is provided in Fig. 3.

50. Paragraph 96 of the draft Guidelines needs to be reworded and should be put in 3.3 of the revised outline.

Obsolete regulations

51. A statement about the need to regularly review fisheries regulation needs to be put in 3.5 of the revised outline but can be removed from paragraph 97 of the draft Guidelines. General heading should be REVIEW: not "obsolete regulation" (institutional review should come under 3.1 and regulatory review should come under 3.5 of the revised outline).

52. There are various levels for review process and activities such as by the:

- State
- Special bodies
- Management agency
- Ongoing consultation with interested parties

53. Review timing/methods can be imposed by legislation, eg: by "sunset" arrangement

Review of Management Agency/Authority

54. With regards to paragraph 98 of the draft Guidelines, it was considered advisable to review performance, effectiveness, efficiency of the fisheries management authority on a regular basis (eg: 5-7 years maximum). This concept should appear under 3.1 of the revised outline.

Dispute settlement procedure

55. A general comment from the group noted that within the revised outline under section 3 a sub-heading on "Dispute settlement" will be needed.

56. Paragraph 105 of the draft Guidelines may be deleted since it is too prescriptive, not related to dispute settlement in any case.

57. With regard to paragraph 106 of the draft Guidelines it is important to stress that the framework for fisheries management arrangements should incorporate mechanisms, (eg: consultative mechanisms) designed to avoid or minimize disputes between interested parties. Some form of categorisation of the nature of "dispute" could be attempted. For example, disputes between: states; states and users; management authority and states; management authority and users; and disputes between interested users.

Importance of fishery MCS for management

58. Delete title "General Considerations".

59. With reference to paragraph 107 of the draft Guidelines the first para (after removing ref to Code) should be taken up front in the new outline (to 2.2 of the revised outline). The wording needs to be modified to highlight that the MCS objectives are not only "state-specific" but also "fishery-specific". MCS requirements will vary according to management options chosen.

60. With reference to item (i) of paragraph 107 of the draft Guidelines this could be shifted to section 3.5.1 of the revised outline. Items (ii) and (iii) of paragraph 107 should be shifted to section 3.4.4 of the revised outline (which may be titled "Surveillance and enforcement".

61. With specific reference to item (ii) of paragraph 107 of the draft Guidelines the specifications for control need not be in the form of written law alone. There may be other forms of voluntary, binding agreements and other traditional norms/values based on socio-cultural systems that exist.

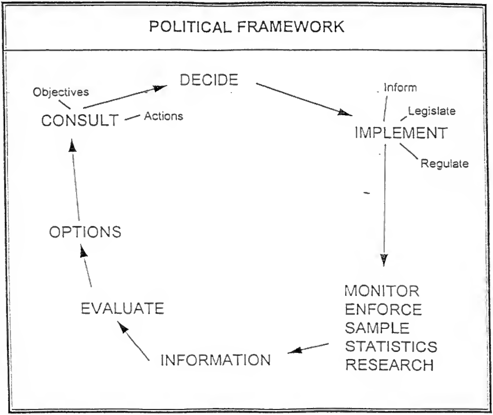

Figure 3. **Example of decision flow chart for managed fisheries.**

APPENDIX A to WG II Report

ISSUES REQUIRING FURTHER DEVELOPMENT

I. There is a need to cross-reference the Guidelines with the Code of Conduct as a whole (not just Article VI), FAO documents and other authoritative reference material, and agreed international instruments (e.g. FAO World Fisheries Strategy 1984, UNCLOS, Agenda 21, etc.)

II. The Guidelines require a comprehensive description of the decision-making process in fisheries management.

III. Key parts of the text could be usefully illustrated by flow charts and diagrams.

IV. The question of how to achieve compliance should be dealt with in an Annex to the document. Monitoring, control and surveillance is considered to be only one means of achieving compliance. The following issues should be considered, but are not intended to represent an exhaustive list:

(a) cost-effectiveness (cost recovery);
(b) economics of surveillance;
(c) self-policing (incentives for voluntary compliance);
(d) multiple objectives (integrated with customs, quarantine, drugs, shipping, etc.);
(e) effectiveness of sanctions and penalties;
(f) relationship of enforcement to the management regime;
(g) identification, in each case, of the objectives and priorities of monitoring, control and surveillance;
(h) balance between education and enforcement to achieve compliance.

V. The issue of rights and claims is a complex issue that is central to the success of any fisheries management regime. Some key issues were identified for consideration under this heading; again, this is not an exhaustive list of issues:

(a) the need to consider the entire legal framework;
(b) the important relationship between rights and incentives;
(c) identification of the nature and characteristics of rights;
(d) the balance between rights and responsibilities;
(e) need to consider relevance of existing literature (tragedy of open access not tragedy of the commons.

VI. The Precautionary Approach. Although the precautionary approach is to be considered further by the June 1995 Expert Consultation, the group considered it important that, for the purposes of the Guidelines on Fisheries Management, the key issue was the application of the precautionary approach to fisheries. It was considered that the precautionary approach did not warrant a separate annex, but that it concerns much more than a resource issue. The document should also consider the relevance of fish as a source of food and the livelihood of fishers. Also, the use of risk analysis needs to be extended beyond analysis of the status of the resource to take account of social, economic and political implications.

VII. The document needs to contain descriptions and examples of management methods. This should be a comprehensive list and should include, for example, community-based management, limited entry, TURFS, taxes, ITQs, sports and recreational fishing.

ANNEX 6

LISTING OF POSSIBLE ISSUES/IDEAS TO BE COVERED IN THE NEXT DRAFT OF THE GUIDELINES

This list should be used in conjunction with the suggested Contents for the Guidelines.
This list only covers some topics under "Elements of Fisheries Management".
This list is to be used as a check-list by future drafters of the Guidelines.

1. Introduction/Background

1.1 Current problems/importance of FM

- Status of fish stocks and fisheries - overcapitalization and conflicts, crisis (SOFA) reference
- Small scale fisheries
- Need for fish as food - short falls in future
- Need for sustainable development
- Concerns over ecosystem impacts and biodiversity
- Importance of FM - scope, methods of addressing above problems, benefits, lost opportunities
- Special characteristics of fisheries

1.2 Purpose of DOC

- Translate principles to usable form
- Elaborate
- Tutorial function
- Audience (in 1.3)
- Need to review the DOC
- See purpose statement on Draft 1
- See Group Reports
- Largely addressed to the management of marine fisheries but many concepts presented in the document are also applicable to freshwater fisheries

1.3 How the DOC will be used (and to whom it is addressed)

- Not a tight "cook book"
- General guide of ideas and options
- Needs translation to local context
- Guide to other references
- Audience
- States
- all interested parties (fishers organizations, NGO, Government Agencies, Conservation Group, Research Scientific, Fisheries Management agencies at all levels)
- Main considerations in main text - more specific ideas in Annex

1.5 Organization of the remainder of the DOC

- Writers of the Guidelines to sort out

2.1 A social contract, etc.

- Fisheries management is about people

- Fisheries management is a "contract" between interested parties, the management authority, in the state, between states
- Contract = consensus = common understanding
- Method of "elaborating" the fisheries management varies
- FM is about the evolving relationship of people and resource over time/space
- Need for an integrated, holistic process
- FM to have regard to social values
- Need for consensus

2.2 Technical basis for FM

- Special characteristics of fisheries

2.3.1 Long and short term

- Issue of sustainability is the aim (Put under 2.3)
- Need support for long term objectives (e.g. political support)
- Need a sound economic footing
- Timeframe for ecological changes/restoration is longer than that of FM
- Prioritization of objectives

2.3.2 Objectives

- Consider conservation objectives as well as biological, economic, social
- Fishing satisfaction
- Consumer needs
- Income/employment
- Large range of possible objectives
- Conflict of objectives = trade offs - need mechanisms to consider trade offs

2.3.3 Constraints

- Need to rebuild stocks - cannot continue to develop/expand
- Innate variability and uncertainty of resource - difficult to "measure" stocks
- Environmental impacts
- Costs are high - research, enforcement, etc.
- Always working with "old" information
- Problems of shared ownership/access (especially shared, straddling stocks)

2.4 Need for a comprehensive description

3.1 FM organization

- Often mixed jurisdiction (resource fleets)
- Who pays for the FMO? - Cost of an FMO is real
- What it does, membership
- Role of the FMO
- Need to devolve to local levels in some cases

3.2 Information

- Always a lack of information for fisheries management decisions
- Therefore precautionary approach
- Involvement of interested parties in information
- Reporting and transparency
- Confidentiality
- FM decisions need to be based where possible on scientific information (quality control, cost effective)
- Need for standardization
- Mandatory vs voluntary information provisions (log books)
- Varying information needs

ANNEX 7

TECHNICAL CONSULTATION ON THE
CODE OF CONDUCT FOR RESPONSIBLE FISHING

Rome, 26 September - 5 October 1994

GUIDELINES FOR RESPONSIBLE MANAGEMENT OF FISHERIES

(First Draft)

PURPOSE OF THIS DOCUMENT

The draft outline presented here of fishery management guidelines, is intended to be used in support of Article 6 of the Code of Conduct for Responsible Fishing the management of fisheries in general, whether they are on the high seas, are straddling stocks, lie wholly within national jurisdiction, or where delimited management responsibilities have been delegated to local jurisdictions within national waters. In order to provide for the necessary generality in all of these cases, the fishery management process is described in terms of a "fisheries management authority", delegated powers by a State or States, to regulate the activities of a series of "interested parties", who are persons or entities which are recognized by the State or States as having a legitimate interest in the fishery resources in question. For the purpose of these guidelines, the term "interested parties" is used in the restricted sense implied by the English term "stakeholders", to include both harvesters or fishers plus those secondary sectors which have an interest in transformation and utilization of the resource, as well as non-exploitive users, who are acknowledged by the State or States to have a valid interest in the well-being of the resource, or to be affected by management measures on the resources.

This legally neutral terminology and broad format is designed to allow, to the extent possible, the use of a similar set of provisions for all geographical and administrative jurisdictions. Whether management is by national regulations, through the provisions of a national or local fisheries management plan, by ministerial fiat, or through an international fishery commission, a considerable number of these guidelines will have some relevance to the fishery management process. It is intended that before using the contents of this document to rationalize management of the fishery in question, that the interested parties be defined as circumstances dictate; whether they be fishers, conservationists, coastal or distant water States, or even local or municipal authorities and communities, or fishers' associations which have been designated partial or complete management responsibility for local resources.

This document draws upon many sources which are not referred to explicitly in the text. These include the 1982 Convention on the Law of the Sea, the Rio Declaration and Agenda 21, the Cancun Declaration, the Convention on Biodiversity and the draft negotiating text and background documents presented by FAO at the UN Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks in New York.

CONTENTS

Page

CROSS REFERENCE BETWEEN ARTICLE 6 (THEMATIC PRINCIPLES) OF THE DRAFT CODE OF CONDUCT FOR RESPONSIBLE FISHING AND GUIDELINE PARAGRAPHS 4

INTRODUCTION 6
- Definitions 6
- Geographical categories 7
- Implementation as legislation 7
- The area of competence of the fisheries management authority 7
- The structure and functioning of the fisheries management authority 8
- The right to fish 9
- The need for resource management and criteria of effectiveness 10

THE SETTING OF MANAGEMENT OBJECTIVES 10
- General considerations 10
- Environmental factors 11
- Economic factors 11
- The broader context of coastal area management 13

THE MANAGEMENT FRAMEWORK 16
- DECIDING ON THE MANAGEMENT FRAMEWORK 16
  - The fisheries management authority 16
  - The Legal framework and fisheries regulations 16
  - Understanding and input of socio-economic factors 17
  - The allocation of fishing rights 17
  - Territorial fishing rights 18
  - The framework for data gathering and fish stock assessment 19
  - Monitoring of compliance 21
  - The framework for ensuring input of technical advice to management 21
  - Coordination between States and with international fisheries management bodies 22
- FLEET SIZE AND EFFORT CONTROL 22
  - Effort control and the right to fish 22
  - Fleet redimensioning 23
- TECHNICAL MEASURES 24
  - Gear interactions and characteristics 24
  - Size limits and mesh sizes 24
  - Managing multispecies resources 28
  - Closed areas and seasons, and conservation of biodiversity 28

THE FORMULATION OF MANAGEMENT MEASURES 29
FISHERY STATISTICS AND RESOURCE MONITORING 29
Data collection 29
Confidentiality and verification of data 31
Timeliness of the submission of data 31
Costs of collection, collation and dissemination of data 32
MANAGEMENT APPROACHES 32
The duty of care 32
Management consultations 32
Precautionary approaches 32
The role of fisheries research 33
Decision-making process 33
Obsolete fishery regulations 33
Review of fishery management 33

STOCK REBUILDING POLICIES AND RESOURCE ENHANCEMENT 34
Some future priorities for fisheries management and stock rebuilding 34
Resource and habitat restoration and enhancement 37

DISPUTE SETTLEMENT PROCEDURES 37
Negotiations between interested parties, and with new entrants 37
Provisions for dispute settlement 37

IMPORTANCE OF FISHERY MONITORING, CONTROL AND SURVEILLANCE FOR MANAGEMENT 38
General Considerations 38

ANNEX 1: Outline for a contract between the interested parties and the fisheries management authority: the concept of a fisheries management plan 44

ANNEX 2: Informal report of a working group on Reference Points from the UN Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks 49

ANNEX 3: A standard classification of fishing gears and associated units of effort in terms of priorities 53

CROSS REFERENCE BETWEEN ARTICLE 6 (THEMATIC PRINCIPLES) OF THE DRAFT CODE OF CONDUCT FOR RESPONSIBLE FISHING AND GUIDELINE PARAGRAPHS

Principle Number		Guideline Paragraphs, Boxes, Annexes
6.1	**Rights and obligations**	
6.1.1		14, 16, 17
6.1.2		20, 22, 90, Box 3
6.1.3		4, 5, 6, 7, 33, Box 1
6.1.4		4, 13
6.1.5		4, 15, 107
6.1.6		7, 10, 50, Box 2
6.1.7		7, 10, 50, 105
6.1.8		7, 10, 105
6.1.9		17, 55, 57, 99
6.1.10		
6.2	**Management objectives**	
6.2.1		11, 19-27, 33, 69-71, 74-75, 92, 95,Boxes 3, 4, 8, 9
6.2.2		19-27, 23, Box 4
6.3	**Management framework and procedures**	
6.3.1		8, 28
6.3.2		8, 9
6.3.3		8
6.3.4		4, 22, 33, Annex 1
6.3.5		4, 22, Annex 1
6.3.6		11, 50
6.4	**Management advice and data gathering**	
6.4.1		11, 12, 41-45, 48, 49, 94, Boxes 8, 9
6.4.2		33
6.4.3		41-45, 76-89, 90, 91, Annex 3
6.4.4		41-45, 48, 49, 90, 91
6.4.5		41-45, 48, 49, 91
6.4.6		34, 41-45, 48, 49
6.5	**Precautionary approach**	
6.5.1		18, 93
6.5.2		34, 93, Box 5, Annex 2

6.5.3	93, Box 5, Annex 2
6.5.4	93, Boxes 5, 8, 9, Annex 2
6.5.5	93

6.6 Management measures

6.6.1	34, 35-40, 51, 53-59, 61, 82, 99, 101, 102
6.6.2	35-40, 52, 53, 105
6.6.3	97
6.6.4	18, 97
6.6.5	61, 63-68, 72-74, Boxes 6, 7
6.6.6	61, 63-68, 100, 103, Box 7

6.7 Implementation

6.7.1	15, 29
6.7.2	15, 46, 47, 50, 107
6.7.3	30, 31
6.7.4	98
6.7.5	106

INTRODUCTION

1. The set of 40 Principles for Responsible Management of Fisheries presented in Article 6 Document FI:CCRF/TC/94/2 have been listed without the technical qualifications which would be necessary in most cases for their implementation in a specific fishery management context. The purpose of the present document is therefore to provide some qualifications to these Principles which may help in deciding on how they may be applied within the fisheries management process. This set of guidelines has necessarily been formulated in as general a context as possible, since it is designed to be applied, (with modifications of terminology and emphasis at the discretion of the user), to management of fish resources in international waters, fisheries management of straddling, shared and highly migratory resources at the multilateral level, management of purely national resources of the EEZ, as well as applying at the local level, where a coastal community is delegated responsibility for managing local resources. Although non-binding, and subject to modification in the light of the particular management context, it is believed to have relevance to regional fishery bodies, States, communities, fishers and their associations, as well as being of interest to NGOs and others concerned with non-exploitive uses.

2. The ownership of living marine resources is not discussed in the document because, with the exception of sessile resources of the seabed and anadromous and catadromous resources, the concept of ownership of living resources was not resolved in the 1982 UN Convention on the Law of the Sea. The UN Convention is expressed in terms of the right to fish, and it is in this context that the powers of the fisheries management authority are considered. It is recognized, however, that different States may vary in the extent to which they are prepared to delegate their management authority, and the associated responsibility for assigning fishing rights or privileges, to a local or sub-national authority (such as an administrative district, region, county or municipality). Such a delegation may vary from the formulation of regional resource management plans, assigning or registering of fishing rights, to the setting of catch limits, or the provision of geographically-based exclusive leases of areas of coastal waters, estuaries or lagoons for aquaculture or shellfish rearing, or the prosecution of infringements of local fishing regulations.

Definitions

3. This Chapter of the Code concerns the responsibilities and activities of two entities: the interested parties[1] and the fisheries management authority. These entities are deliberately defined in the Code in a very general way, such that they do not interfere with, or contradict, existing definitions in other legal instruments such as the Convention on the Law of the Sea.

4. The following definitions are basic to the development of this Chapter of the Code of Conduct:

> *Fisheries management is the integrated process of information gathering, analysis, planning, decision making, allocation of resources and formulation and enforcement of fishery regulations by which the fisheries management authority controls the present and future behaviour of the interested parties in the fishery, in order to ensure the continued productivity of the living resources.*

---

[1] In English, the term "stakeholders" reflects more exactly the limited category of recognized "interested parties" in the sense used in this document. However, in order to facilitate translation, this term is not used in the present document since equivalent words are lacking in some other languages.

The ***fisheries management authority*** *is the body which makes the decisions on how the fishery is carried out, and is responsible for all ancillary services, such as statistics gathering, assessment, MCS, consultation with fishers and other users of the sea, and resource allocation or determining the conditions of access to the fishery.*

The term ***interested party*** *refers to any party who has been accepted by a State or States as having a legitimate interest in the living marine resource being managed.*

A ***fisheries management plan*** *is an explicit arrangement (contract) between the interested parties as defined above, and the fisheries management authority which makes explicit the objectives and means of management, the nature of the management authority, its powers and responsibilities, its working and consultation procedures, as well as the rights and responsibilities of the interested parties in the fishery.*

Geographical categories

5. It is intended that before applying the Code, for whatever geographical category of resource, that these entities should be defined more explicitly, and the items of the Code that apply at each level should be selected from the total (i.e. not all Items in the Code may apply equally at all levels). Box 1 lists possible fisheries management authorities and
interested parties for different geographical categories of resources.

Implementation as legislation

6. If it is decided to base a legally binding document on this section of the Code, the first task should to be to negotiate the names of the interested parties and the nature of the management authority. The second stage is for the interested parties, once identified, to recommend which of the items in the Code are to be included within the terms of reference of the fisheries management authority, and how the activities of the authority are to be structured, in light of this Code.

7. The nature and components of the fishery management process in the different geographical contexts described earlier are described in Box 2.

The area of competence of the fisheries management authority

8. The area of management of the authority should include the entire stock area of the resource or resources being managed, since the proper unit of population management, following Darwinian principles, is a self-reproducing population or "unit stock", and such a unit stock needs to be managed as a whole within its limits of distribution. If the area of jurisdiction of the management authority as constituted only covers part of the stock area, it will be necessary to set up a consultative mechanism with other authorities across whose jurisdiction the resource lies or migrates. In the case of a resource lying across two or more jurisdictions, the States or Territories whose waters are involved (whether they fish the resource or not) are the interested parties, and not the fishers themselves (who may however be designated as interested parties for locally managed or national stocks).

Box 1: Possible fishery management authorities and interested parties for different geographical categories of resources

Geographical Category of Resource	Management Authority	Possible Interested Parties
High Seas Stocks	International Fishery Commission, United Nations	Coastal and DW States; NGOs on Conservation
Straddling and Highly Migratory Stocks	International Fishery Commission, United Nations; (bilateral negotiation between coastal and DWFNs?)	Coastal and DW States; NGOs on Conservation
Shared Stocks	Bi(multi)lateral negotiations or Joint Standing Commission	Coastal States: Fishermen's associations, NGOs; Sports Fishermen
National stocks	The Minister of Fisheries or government-industry Standing Committees and their Scientific Advisory Bodies	Sports and Commercial Fishermen and their Associations; (the Provinces, Prefectures or States for Federated States); the Ministry of Environment, the national NGOs on resources.
Local stocks	Community-based Fisheries and/or Environment Committees?	The fishermen; their communities or communes; the local citizens or municipalities; sportsfishermen, ecology movements, indigenous peoples, etc.

9. The extent of the resource and its migratory routes can be determined through seasonally and geographically-defined catch records, and accompanying biological information on the catches. A joint tagging experiment may be organized if all fishing parties are agreeable, and if properly designed, can provide more detailed information on the spawning and feeding grounds, growth and mortality rates and migration routes of the species concerned. (Current developments in population genetics are also beginning to allow genetically separate populations to be identified more accurately.)

10. In the case of shared and straddling stocks, it does not of course follow, that all interested parties have rights of access to the unit stock throughout its range. They do have the responsibility, however, recognized under the Convention on the Law of the Sea, to set up a management authority, share data collected in a uniform and accurate way on captures throughout the range of the stock, assess the states of the stocks, and cooperate in rational management of the resource.

Box 2: The nature and components of the fisheries management process

The fisheries management authority is delegated its responsibilities by a State or States. In the case of resources lying wholly within national waters, the delegating authority is the State; acting on behalf of its citizens. The State may delegate its authority over local resources to local or regional administrative units, communities, or groups of citizens (notably fishermen), but in this case, the delegation of authority may not be complete, so that the local fisheries management authority may remain subordinate to the national authorities in respect of some issues.

Although the matter of ownership of living marine resources is not resolved, the UN Convention, along with UNCED in effect emphasise the overriding international interest in the protection of the resources, and the need for cooperation in order to protect the resources. They in theory are therefore available to harvesting by all States, even though in practice, relatively few States exercise the right of harvesting these resources. Together with adjacent coastal States, interested States, including those harvesting high seas resources, may constitute, *de facto*, a fisheries management body or fishery commission. This then assumes the role of the fisheries management authority. Such Commissions will almost certainly have an important role with respect to a third category of living marine resources, namely, straddling or highly migratory resources, which lie or move across high seas and national jurisdictions; hence the interest, both of coastal States and High Seas Fishing nations in the exploitation of that component of the resource which lies beyond national jurisdiction.

Evidently, in the case of fisheries in international waters, under this definition, the States whose fishermen exploit high seas resources are among the interested parties, and must take responsibility for their fishermen. In the case of fisheries within national waters, States must decide whether the appropriate government department should be advised by representatives of the fishermen, processors, fleet owners and their representatives, together with other parties having an interest in the welfare of the living marine resources, should be among the interested parties. The fisheries management authority should recognize that other citizens' representatives who can show a legitimate interest and commitment to the livelihood of the living resources concerned can also be admitted as interested parties.

The structure and functioning of the fisheries management authority

11. A fisheries management authority should place constraints on the upper limits for resource exploitation; explicitly taking into account the best scientific evidence as to the state of the resource, the likely accuracy of these estimates, and on a precautionary assessment of the levels of harvest which will not prejudice future productivity from the resource in question. Advice on these resource issues should come from a resource advisory group, whose work should be based on objective, reproducible and transparent methods of estimation, and data that should be available in the public domain. The authority and its interested parties should address the question of financial and technical support necessary for reliable statistical gathering and research.

12. The authority may of course request its resource advisory group to consider the effects of, or the catch and effort levels corresponding to other management targets than that corresponding to the upper safe limits for exploitation. Targets may be for example, based on economic, social or environmental criteria (see Box 3). Meetings of the resource assessment group should provide a forum for discussion on technical issues related to the biology, economics and environmental aspects of the scientific assessment of resources, and on the comparative advantages of different methodologies. The fisheries management authority, as part of its constitutional requirement to

collect and analyse information on the resource and its fisheries, should encourage the setting up of data networks with institutes, other commissions and experts, to ensure that new developments are reflected in the workings of its scientific and advisory bodies.

The right to fish

13. Within national jurisdiction, fishers are assigned rights to fish by the fisheries management authority set up by the State. Where, as on the high seas, explicit resource ownership is undefined, States are regarded in effect as "custodians" of the living resources of the high sea on behalf of humanity. The actions of their nationals on the high seas fall under the responsibility of the flag State, which negotiates on management issues on their behalf, and has the duty of enforcing measures agreed to in an international fisheries management forum. The mode, extent and conditions affecting resource use under which the fishers of these States are assigned the right to fish in international waters, are determined by common international practice, as modified by agreement between members of the world community.

14. The right to fish is not automatic, but is conferred by States onto the fisheries management authority delegated to manage the resources, and may be ceded in turn by the authority to a limited number of participants in the fishery. Fishers receiving this right to fish do not acquire unlimited or indefinite ownership of a public or international resource, but have responsibilities as custodians for its continuity, for maintaining intergenerational equity, and should respect the conditions under which a licence to fish is given, and under which it can be withdrawn if these are not fulfilled.

15. The delegation to the fisheries management authority of the responsibility to manage living marine resources must be accompanied by the necessary powers to set fishery regulations and to ensure that they are enforced. Failure by the interested parties or their representatives to abide by the regulations set by the authority must lead to penalties which should be set at a level to be effective deterrents. Such deterrents should include the loss of the right to participate in the fishery.

16. The fundamental requirement that precautionary management procedures seek to avoid levels of exploitation that lead to stock collapse, has its socio-economic equivalent in the concept of inter-generational equity. This concept may be especially persuasive where fishers are among the "interested parties", since it allows precautionary criteria to be developed that have immediate relevance, namely that the descendants of the current generation of fishers have the right to a livelihood that is equally remunerative as that of their parents' generation, a criterion that can only be satisfied if the criteria for stock replenishment are maintained.

The need for resource management and criteria of effectiveness

17. There would appear to be wide agreement that the lack of responsible and effective management of marine resources, whether within national jurisdiction or on the high seas, is the major reason why many fisheries can be characterized by a condition of unconstrained fishing, stock depletion and lack of profitability. This is the perspective that encourages FAO to offer the present set of non-binding principles and guidelines for consideration, and hopefully implementation, both within Exclusive Economic Zones, and beyond.

18. It is important that the management authority recognize that while not all fisheries regulations are aimed at the conservation of the resource, the sum effect of all regulatory measures and their degree of enforcement, on the state of the resource, may not be predictable, and should be judged

from this perspective. This will require adequate monitoring independent of the management framework and regulations in place, and a rapid and precautionary response by the management authority is needed when it is clear that the existing regulatory framework is not protecting the resource.

THE SETTING OF MANAGEMENT OBJECTIVES

General considerations

19. One important reason for the failure of management to control the increase in fishing effort in so many fisheries around the world, is not only the absence of agreed management objectives, but agreed long-term as well as short-term strategies for realizing them. Often negotiations on management measures concern only decisions over the short term, and tend to be aimed at the conservation of the equity of interested parties in the resource, with no specific reference to a common long-term objective, if one exists. Even though short-term measures can and should be tailored to move in the direction of a long-term objective, this requires a multi-year time span for decision making, which is rarely explicitly addressed by management bodies. In this section, the objectives to be discussed are largely long-term in nature.

20. No management objective should be excluded from consideration that conserves intergenerational equity in the resource being managed, and does not endanger the capacity of the ecosystem to sustain harvests into the future. Some common management objectives are given in Box 3.

21. Fisheries management authorities often need to respond to a range of demands from interested parties, society or from participating countries. Although these objectives are not always in agreement, they can often be arranged into a hierarchy. In the case of disagreement on a common objective, the overriding consideration should be to ensure the preservation of nature for future generations. Conflicting objectives are discussed in Box 4.

22. More specifically, Article 61 of the 1982 UN Convention on the Law of the Sea addresses limits to the allowable catch of living resources in an exclusive economic zone. Generalizing this by substituting "interested parties" for the "coastal State", this can be expressed as:

> The interested parties, taking into account the best scientific evidence available to them, shall ensure through proper conservation and management measures that the maintenance of the living resources in question is not endangered by overexploitation. As appropriate, the interested parties shall cooperate to this end.

It should be recognized that fishers and, in particular, the skippers of fishing vessels, have to be assigned an explicit role in the management process. Experience has shown that given the cost and difficulties of policing fishing at sea, and the independence of action typical of high seas fishers, regulations with which the fishers are not in agreement, or where they are not informed of the basis for the regulation, will be evaded without great difficulty. There is therefore a requirement for an explicit and public statement of the objectives and means by which a fishery is to be managed, now and in the immediate future, and where possible, fishers or their representatives should be in explicit agreement with this statement. Such a consensual public document is referred to here as a fisheries management plan (see Annex 1).

Box 3: Some common management objectives

(i) Biological and ecological objectives: The objectives for a fishery are often defined in biological terms, and widely understood concepts of the population biology of fish stocks underlie many current fisheries regulations. The underlying reason for this is that all other objectives will fail to be realized in the long term if continuity of resource productivity is not first assured. There has however been a rapid evolution of our understanding of the key biological factors of importance.

(ii) Environmental objectives: It is well established that all living marine resources undergo long-term as well as short-term changes in abundance and productivity to different degrees. Human exploitation of the resource will influence the degree and severity of such long-term fluctuations. Overexploitation will have its most severe impacts in periods when stock production is already adversely affected by unfavourable environmental conditions. During these periods it is prudent and precautionary to ensure that minimum stock levels for resource replenishment are respected. Other than fishing, mankind has also a direct effect in changing the environment of many resources in a direction often unfavourable to continued economic production from a resource. The fact that agencies outside the fishery sector have a negative influence on the productivity of marine resources cannot be dealt with explicitly in a code of practice aimed at fisheries, except of course (see later) that the interested parties should seek legal recourse against such impacts from outside the fishery sector.

(iii) Economic and political objectives: In the broadest sense, the economic objective for a fishery would be the extraction of economic rent. [Economic rent may be defined here as that portion of the national income from the living marine resources accessible to it, or from the fishery sector, which is attributable to the productive capacity of the sea, over and above normal returns to capital and labour]. The political objectives underlying management can probably be best defined as the sharing of resources between competing interest groups in a peaceful manner.

(iv) Objectives of the small scale sector: The presumed objective of local inshore fishermen's associations is one of retaining local control of living resource access rights and employment access to the fisheries of their stretch of the coast. This type of objective has more recently been revived as a primary one in several countries, since, as noted above, it has been realized that this contributes to community development, as well as providing high quality fresh fish to local markets. It therefore has some of the qualities not just of a means of employment, but as a service to the population as a whole, which is additional to the value of the goods supplied by fisheries. A key factor here is the importance of fish in the animal protein requirements for rural populations. Due to the shortfall in fish relative to increasing demand, the price of fish may become progressively unavailable to local income levels in developing countries. Under these circumstances, the only way of ensuring access has been to give impoverished persons direct access to the resources for direct human consumption. This humanitarian approach has unfortunately not worked in favour of maintaining the maximum productivity of the resource as a whole, and has in fact seriously reduced the overall productivity of marine resources.

(v) Objectives of the industrial fishing sector: The industrialization of the fisheries sector is a valid option where resources exist in large quantities, distant from the coast, and where weather conditions and absence of ports or coastal transportation impedes the artisanal sector from fishing them. It has also been the only option for establishment of high seas or distant water fisheries. The establishment of industrial fisheries has been dependent on the existence of substantial investments in shipbuilding, technology and transportation, but these investments have often been jeopardized by a lack of control of access, with consequent declines in returns on investment; not to mention conflicts with the small-scale sector, which have lower costs under intensive exploitation.

Box 3 continued

(vi) Objectives shared with sectors outside fisheries: Objectives that support the maintenance of fisheries sector, irrespective of its economic performance, may include a range of other considerations. For example, national fisheries assume some of the character of a service industry to other sectors of the national economy. Some further examples of objectives are:

- the desire to ensure a continuity of supply (e.g. of high priced fish for tourism);

- the desire to maintain employment in coastal communities, and to reduce social unrest and the drift of unemployed workers to urban centres;

- the presence of fishing vessels in an area may be perceived to preserve historic rights to make future claims on waters or resources lying beyond territorial seas, or to justify 'a place at the table' in negotiations on the same;

- the contribution of marine fisheries may in part be used incorrectly to justify shipbuilding industries, harbours, safety and communications, and other aspects of coastal infrastructure.

Fisheries are not always covered by a separate Government department in some countries, and hence the formulation of specific fishery objectives may be subordinate to, or merged with, objectives defined for other sectors of the economy. The fishing industry is thus only one of the "users" of coastal aquatic ecosystems. Other uses such as waste disposal, recreation, protection of endangered species, etc. must be included along with fisheries in a more general ecosystem management. Other users of the coastal strip and contiguous and incoming waters have competing claims with fisheries, but a flourishing fisheries sector may be regarded as an indicator of the 'health' of coastal waters. (The merging of objectives between fisheries, tourism and other economic sectors is in fact, a strong argument for presenting a unified approach to defining policy objectives in the ICAM context).

(vii) Objectives for shared, straddling and highly migratory stocks: There are also conflicting objectives between different countries with respect to resources harvested in common, and real differences in national policy for example with respect to fish for food, or as a source of export revenue, between countries harvesting a common resource. These differences may result from a wide spectrum of political, legal and cultural traditions in the countries sharing access to a common resource.

(viii) Protecting socially or economically disadvantaged groups: Provision should be made for the dietary needs of persons dependent on the marine resource in question for their subsistence, before allocations or access rights are negotiated between interested parties whose main interest may be in commercial exploitation of the resource.

(ix) Protecting the rights of indigenous peoples: A long continuity of exploitation of the resource should be the grounds for a controlling say in the management of the resource, as long as the proper measures are taken to ensure resource continuity.

Box 4: Conflicting objectives within the fisheries sector

As a qualification to statements in Box 3, it should be note that, for many resources, the primary step of specifying explicit management objectives has never been taken. Even within the national fisheries sector (e.g. between artisanal and industrial fisheries; or between aquaculture and wild fisheries), it is difficult for the interested parties to agree on common objectives. Such a difference in objectives will also occur between contiguous States in the case of shared resources, and between distant water fleets and those within national jurisdiction.

For both the resources of EEZs and high seas resources, the impact of this difference in management objective between two or more parties often poses the major problem in arriving at a common management framework and approach.

Such conflicting objectives may occur between two fleets within an EEZ (for example, from different ports or using different gears), but differing objectives become even more difficult to resolve in the case of stocks lying across, or migrating across, the boundary between two EEZs ("Shared Stocks"; or when the stock lies across, or migrates across the boundary between the EEZ and adjacent high seas areas, "Straddling Stocks").

Emphasis is usually placed on the importance of stating management objectives clearly, and early on, in the management process. This is necessary in order to arrive at a compromise between conflicting objectives, but it should be recognized that although an open statement of objectives is always desirable, not all interested parties in a fishery may wish to openly state their underlying objectives, and these may not always stem from considerations specific to the fisheries sector. In some cases, there may be a 'hidden agenda', whereby an objective (such as national security), while important, is not mentioned openly, and in setting objectives, the close relationship between political considerations and the resource management objectives, needs to be recognized. Political considerations in fact often precede, and lead to management objectives. It is the contention here, however, that whatever the political consideration underlying the objective of an interested party in the fishery, following UNCED this objective is only acceptable if it conserves intergenerational equity, and hence results in an exploitation pattern and intensity that respects the capacity of the resources to support exploitation and reproduce itself, and is not detrimental to the long-term productivity of the ecosystem of which the resource is an integral part.

Environmental factors

23. The main environmental objective of responsible fishing should be to ensure that fisheries are prosecuted in an environmentally-friendly fashion.

Economic factors

24. It may be supposed that the ideal situation for the marine resources available to a coastal State is that they provide a normal livelihood to fishers and a return on their investment at least equal to that earned in equivalent occupations. The interested parties should provide for the cost of operation of the fisheries management authority at a level adequate for it to discharge its functions.

25. The total costs of fisheries management, in the absence of subsidies from other sectors of the economy include the costs of research, statistics, surveillance, services to fishers etc. It seems unlikely that many world fisheries are currently generating resources sufficient to support these functions where they exist, and hence the costs of coordinating research, data gathering, surveillance etc. are often subsidized directly or indirectly (see SOFA 1993). One explanation frequently offered, falling under the heading of the "Tragedy of the Commons", is that where access to the resources is uncontrolled, the resource rent needed to ensure proper management is not being generated so that the total costs of fishing by all interested parties equals or exceeds revenues.

The broader context of coastal area management

26. A better understanding of the reasons why fisheries often continue to receive subsidies despite their poor overall economic performance, can be obtained after addressing their role in coastal communities. Apart from their role in supplying a valuable and healthful source of animal protein, they play a substantial role in justifying coastal facilities such as harbours, shipbuilding yards, freezing plants, food processing industries and repair facilities, as well as helping to justify expenditures on maritime communications, search and rescue facilities, marine coastguard and lighthouses, and a marine weather forecasting service. The extent to which these facilities should be considered as costs to the fishing industry is doubtful; in many cases, the presence of an active fishing sector has been offered as a justification for facilities that contribute to the possibility of developing other sectors of the coastal economy. Other reasons why marine fisheries receive subsidies relate to their role in food security programmes, and in the provision of an "employment of last resort" for unskilled labour displaced from other sectors such as industry and agriculture. This last perspective has of course had the deleterious effect of encouraging over-manning of the fisheries sector with consequently, an excess in capacity in many fisheries. This in turn leads to the spectre of stock collapse, unemployment and unrest in coastal communities, which places the State in the position of having to retrain and relocate unemployed fishers in other industries, or discourage their movement to urban centres.

27. It is for the above reasons that it is recommended to place fisheries management measures and the role of fishers and the fishing industry in the context of Integrated Coastal Area Management, where this sector may act as a barometer of the "health" of the coastal ecosystem for all sectors of the coastal economy. Many coastal industries impinge directly on the fisheries sector, such as shipping, oil drilling, gravel extraction, tourism, waste disposal at sea, the installation of marine pipelines and cables etc. Fisheries may not readily coexist with some of these activities without social friction or impacts on the resources themselves, and those with explicit rights to harvest resources should be encouraged to seek redress against impacts on their livelihood caused by careless or polluting activities in other sectors. Maintaining communications between sectors through a cross-sectoral consultative process can prevent the need for more conflictual solutions to the problems of coastal economic development.

Box 5: Reference points for fisheries management

DEFINITION: A Reference Point is defined as "a conventional value derived from technical analysis which represents a state of the fishery or population whose characteristics are believed to be useful for the management of the unit stock in question".

When expressed in terms of the rate of exploitation, different objectives may be arbitrarily categorized into low, medium and high rates of exploitation. Annex 2 gives the conclusions of an international working group on the question of Reference Points for Straddling and Highly Migratory Resources.

Fisheries objectives may be expressed in general terms such as "the need to maximize employment in fisheries" or "to minimize variations in fish supply". In translating these objectives into concrete management measures, it should be recognized that the actions available to managers of a fishery for wild stocks are largely limited to changes in the rate and conditions of exploitation, and the allocation of access or total catch among interested parties. There has therefore been the tendency to associate certain objectives with one or more so-called Reference Points.

The table below classifies some different fishery objectives, in terms of their equivalent rates of exploitation, and (in the bottom row) some roughly equivalent target reference points for management. (See FAO Fish. Circ. C864 for definitions of RPs)

Low exploitation	Medium exploitation	High exploitation
Optimize management of larger, long-lived species	Maximize economic return to the fishery sector	Maximize annual multispecies yield irrespective of low catch rates, variable yields, and low economic returns
Maintain steady supply of large, high quality fish to market at favourable prices.	Minimize socio-economic impacts on coastal communities dependent on fisheries	Fishery is aimed at short-lived species with no interest in longer-lived demersal species
Optimize sports fishery/tourism	Optimize conditions for food security and inter-generational equity	Attempting to maximize employment in fisheries in the absence of entry controls leads to subsistence fisheries
Extract economic rent from fishery	Extract economic rent from fishery	No economic rent extracted from fishery
Rebuild stocks and reduce impacts of fishing on biodiversity	Create conditions for economic development in coastal communities	Impose subsidies to rescue fishermen/enterprise from economic collapse, but increase risk of resource collapse
Relevant technical reference points: F_{LOW}, F_{MCY}	Relevant technical reference points: F_{MEY}, 2/3 F_{MSY}, $F_{0.1}$, F_{MBP}	F_{MSY}, F_{MAX}, F_{HIGH}

THE MANAGEMENT FRAMEWORK

DECIDING ON THE MANAGEMENT FRAMEWORK

The fisheries management authority

28. Responsibilities of States for resources lying wholly or partly outside EEZs have recently been addressed by the United Nations and Member States at the Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks during its sessions in 1993 and 1994. A broad consensus seems to be emerging on the main principles which underlie high seas fishery management, which are reflected in the following sections. Although the possibilities of enforcing a Code of Conduct for responsible fisheries management are much greater for resources under national jurisdiction, the relevant technical provisions on which a broad consensus seems to be emerging, should certainly not be restrictive for management of national resources.

The legal framework and fisheries regulations

29. For the high seas, the legal framework for fisheries management is set out in the Law of the Sea Convention 1982, though more detailed points for fisheries management are also found in UNCED and in the UN Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks. Within territorial seas and EEZ's, domestic legislation will have to be enacted to provide the basis for a fisheries management authority and a fisheries management plan and, if necessary, to delegate fishing rights to sub-national groups or administrative units within the State. This legislation should be general in scope and provide the justification for the fisheries management authority with the necessary powers to formulate technical measures and enforce the corresponding fisheries regulations.

30. Many fisheries management authorities operating today are less than fully effective since the necessary funds for their functioning are not provided for under their founding convention, and they are dependent upon voluntary contributions. The non-mandatory nature of such contributions can compromise those management decisions which depend on restraint by the parties concerned: a situation aggravated by the often voluntary nature of membership of these bodies, which means that not all parties exploiting resources in an area of open access are participants in the fisheries management authority.

31. An appropriate share of resource revenues should ideally be set aside to cover the costs of those functions indispensable to resource management, and sanctions should be defined for those that do not abide by the rules of the fisheries management authority. Such sanctions for non-payment of dues, or infringements of the rules of the fisheries management authority, may be expressed in financial terms, or as a fraction of the value of established harvest rights for the party concerned.

32. Although enabling legislation is essential in order to provide legitimacy to the regulations formulated by a fisheries management authority, it is not generally desirable that routine management provisions of a technical nature (such as closed seasons, size limits etc) should be specified in the basic legislation that governs the actions of the fisheries management authority. This legislation should, to the extent possible, be maintained immune from frequent changes due to technical and social developments, and other short-term factors that influence the fisheries sector. These technical provisions should, wherever possible, be included in the fisheries regulations as opposed to the basic law, and in such a way that enable them to be readily amended to incorporate changes in fisheries conservation and management measures. Alternatively, they might be included as conditions governing a licence issued for fishing. Whichever system is adopted, it is important to ensure that they are readily enforceable, and that jurisdictional and administrative procedures are effective.

33. The fairness of enforcement of such a system of regulations, and its acceptance by fishers of course requires that the management framework involve a consultation process with the fishing industry. Such a consultation process is reinforced in some countries through an extension service that serves as a grass roots means of communication on matters of common concern between the fishing industry and the government.

Understanding and input of socio-economic factors

34. Current perceptions of fisheries where open access applies, are that resources tend to be exploited at levels at or beyond those giving MSY, and as noted in Box 5, under these conditions, the level of effort providing maximum economic returns to the fishery has already been exceeded. When a decline in profitability of the fishery occurs, with social consequences for those involved in the primary and secondary sector, a state of overexploitation may well already exist. It is essential therefore that economic and social information be gathered by interview or through fiscal sources in order to measure the health of the fishery, and indirectly of the resource. This information, once analyzed, may aid in reducing hardship to those affected by resource declines, can protect interests of consumers, and be essential for future planning in the sector.

The allocation of fishing rights

35. Fisheries laws and regulations, should, where practicable, recognize that a long-term presence in the fishery confers certain rights of access that should not be arbitrarily changed by the State or its fisheries management authority. It does not follow however, that an interested party which harvested a larger annual share of the resources than other participants prior to limited entry, should see this reflected in a formal allocation. Since the goal of social reconciliation is an important one, changes in fisheries regulations that favour one group of fishers over another are to be avoided where possible. This axiom may not however always apply to the different methods of harvesting that operate on a stock. Some methods of harvesting may be shown to be harmful to the resource and its biological or physical environment, but such a demonstration should lead to fishers being encouraged to move towards less harmful methods of harvest within a prespecified time period, and not to their arbitrary exclusion from the fishery.

36. With respect to the question of catch allocation, where these allocations are specifically made, similar considerations may apply, and where there is a pressing need to reduce catches, this should not be done at the expense of one group, unless some sort of equitable compensation is provided. In a developing fishery, where increased catches prove to be possible, if this can be shown to be achievable without affecting the rights of those in the fishery to a steady continuation of their earnings, the fisheries management authority may increase access to the fishery. Such a decision should follow a formal review of the underlying stock status that shows that this meets precautionary principles, and the allocation of new licences should be transparent and carried out under impartial review. In allocating management rights, priority should be given to the existing rights of indigenous peoples dependent wholly or in part on fisheries for their livelihood.

37. Other more specific systems of allocation of fishing rights have been adopted in some countries. In particular, the individual transferable quota or ITQ has been adopted for management of fisheries based on target species with relatively low diversity of by-catch species and where there are several easily controlled points of landing. The basic justifications of this approach is that it reduces the confrontation between industry and government characteristic of traditional management systems, by placing some of the onus for control on "shareholders" in the fishery, and also in part by instituting formal documentation and reporting procedures. The responsibility is delegated to the private sector for deciding on allocations, which are tradeable, and hence whose value is subject to

market forces. This system allows recreational and commercial interests to be satisfied; both groups of interested parties pay an annual resource rental for their long term fishing right, which (unlike open access systems) allows the government to recover some rent from the resource. This rent is based on traded values of quotas and documented industry profitability. The role of the fisheries management authority in this system is reduced, but it still plays a pivotal role in monitoring the activities of the industry, maintaining paperwork, setting resource rents, and organizing trading in fishing rights. Under these circumstances, the management authority adopts largely the role of arbitrator and surveyor of the resources, activities which may be paid for from the resource rent received.

38. ITQs are generally allocated initially to those with a documented history of participation in the fishery. Generally, the right to fish rapidly acquires a much higher value than that of conventional fishing licences, and cannot be arbitrarily removed from the possessor. Proportional tradeable allocations have proved to be safer than absolute allocations which may place the resource in danger when stocks are at a low point in their production cycle. The main disadvantage perceived with the ITQ system, is that without controls, it can encourage monopolistic tendencies, and ownership can move out of the hands of fishers and away from coastal communities. One approach which partly counteracts this problem, is the allocation of Community Transferable Quotas, where an allocation of the right to supervise trading of quotas is transferred to a local district or municipality, and possession of fishing rights is restricted to members of a coastal community.

Territorial fishing rights

39. The provisions specified in the licence to fish should set territorial limits to the right to fish, and on the gear type and characteristics, the species and the allowed season of fishing within these areas. It is desirable that although rights to fish more than one resource may be specified within a licence, that these multiple access rights be granted separately by area, and preferably by unit stock. Open licences which specify the right to fish multiple resources in multiple fishing areas, can lead to pulse fishing activities, whereby the fleet all concentrates on one resource until fished out, before moving on to another. This is not conducive to responsible stock management. It may be desirable to specify that only one stock of a species be exploited in a single trip, in order that proper documentation of removals between adjacent stocks subject to different management controls not be compromised by unrecorded mixing of catches from areas under different management provisions.

40. Under certain circumstances, especially where individual fishing rights have been granted, there may be recognition that a particular fisher, or group of fishers, have exclusive rights of access to a particular area. This may be encouraged, since it leads to a degree of self policing, and the willingness to invest in measures (e.g. artificial reefs) that increase productivity. The feasibility of granting such leases, even distant from the shore, is now increasing with availability of satellite navigation systems with high spatial accuracy. Such systems should be reviewed by the fisheries management authority and the boundary marks between adjacent leases or territorial claims registered by the authority.

The framework for data gathering and fish stock assessment

41. The management authority is responsible for overseeing or setting up the mechanisms for the routine collection of appropriate data on the state of the resources, surveys and fisheries research. Information should also be collected and routinely analysed on costs and earnings of interested parties in the fishery, and on their social needs and interactions with the community and fisheries management authority. The authority needs to seek ways of collecting unbiased spatially-discriminated data on catch effort and vessel operations, and on the underlying changes in the

resource base and its environment. Such data should be provided to interested parties in a regularly updated fashion, without compromising the identity of those interested parties supplying the data.

42. With respect to the status of the resource, an appropriate mechanism for providing scientific advice needs to be set up and funded, and incorporated into the fisheries management organizational framework. For stocks exploited by different parties, it is important that a common data collecting framework be decided on, such that the harvest and returns of different participants can be compared on a common basis. A specific resource advisory service or committee may be set up (see Figure 1a) with the role of keeping the resource status under review. Its terms of reference are to provide the best current advice on the state of resources and the economic performance of the fishery, based on objective analysis. This advice, in the form of a set of options for action, and the likely consequences of action or inaction, should be provided to the managers, and used as a basis for management decisions.

43. An appropriate sequence of data collection and surveys, information analysis, development of precautionary and risk-averse management options, consultation and review of these options with interested parties, and finally decision making, will need to be set up. This will have to follow an established sequence or "management cycle", within an established calendar that reflects the life history of the resource and the seasonal operations of the fleets. Such a cyclical annual or multiannual sequence of events will need to incorporate feed-back and quality control loops between the components of the system, and it will be desirable that a division of powers be provided between the components of the system such that errors in each stage of the management "cycle" be picked up that could lead to biological or economic disadvantage or stock collapse (See next section).

44. Three approaches to the gathering of basic data on catch and fishing effort have been taken: port interviews at the point of unloading, the use of vessel logbooks and at -sea observers. All of these have their advantages and disadvantages. The first two, although they can be supplemented by catch inspection and sampling, obviously may suffer from potential misreporting of the location of capture, and do not detect illegal sales and transfer at sea. This is why the third, more expensive, option has often been adopted for industrial scale vessels. In the absence of a foolproof control of the quantity, species and provenance of landings, the data used for management may be biased, perhaps seriously. A careful review of potential errors or biases in data gathering is important, since proper setting of management targets depends on this. In some cases, where biases are suspected, the use of impartial random fishing vessel surveys may be needed in order to have an estimate of the stock size remaining on the grounds, as a basis for deciding on conservative harvesting measures.

45. The collection and analysis of relevant economic data, and data on the cost of fishing and of fisheries management, on consumer prices, and on the volume and prices of fish imports and exports, will be needed in order to evaluate the effect of regulations on the fishing industry, and on the governments capacity to extract rent from the fishery.

Monitoring of compliance

46. To ensure that established by-catch and discard criteria are complied with, management authorities should ensure that the operations of fishing fleets are closely monitored, either by on-board observers, or from fishery protection vessels and aircraft. New technological developments such as telemetry and black boxes linked by satellite to a shore station, are now available, and with proper safeguards, can permit remote monitoring of vessel operations even in the absence of on-board observers. The installation of such systems as a condition for licensing, especially in distant water

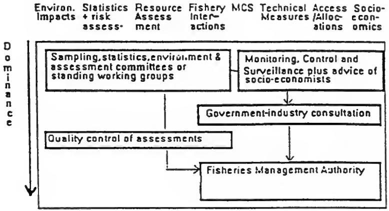
Environ. Impacts
Statistics + risk assess-
Resource Assess ment
Fishery Inter-actions
MCS
Technical Measures
Access /Alloc-ations
Socio-econ-omics
D o m i n a n c e
Sampling, statistics, environment & assessment committees or standing working groups
Monitoring, Control and Surveillance plus advice of socio-economists
Government-industry consultation
Quality control of assessments
Fisheries Management Authority

Figure 1(a): One conventional flow of decision making in fishery management, with subject areas discussed by the various committees listed along the top, and order of seniority or dominance of the committees, working groups, and of the Authority with the right to final decision-making (e.g. the Minister of Fisheries), shown from top to bottom.

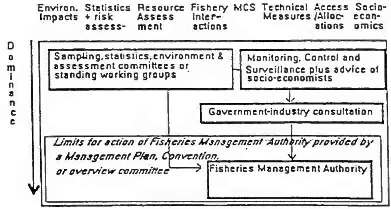
Environ. Impacts
Statistics + risk assess-
Resource Assess ment
Fishery Inter-actions
MCS
Technical Measures
Access /Alloc-ations
Socio-econ-omics
D o m i n a n c e
Sampling, statistics, environment & assessment committees or standing working groups
Monitoring, Control and Surveillance plus advice of socio-economists
Government-industry consultation
Limits for action of Fisheries Management Authority provided by a Management Plan, Convention, or overview committee
Fisheries Management Authority

Figure 1(b): One alternative configuration for decision making, in which the fishery management authority either agrees with the interested parties on a fishery management plan constraining allowable management options, or cedes to an overview committee (temporarily or permanently) the right to make decisions under limiting conditions when the stock or fishery.

fisheries, merits serious attention from fisheries management authorities where industrial scale fishing vessels are concerned.

47. Methods of output control such as catch quotas, may not always be a suitable for situations of high species diversity, and when a wide range of fishing gears are operating. Methods of input control, such as controls on subsidies and fleet replacement/construction are seen as potentially more effective in these situations. Target species regulations in mixed species fisheries should be adjusted to ensure the sustainability of all economic resources, and to optimise the global benefit/cost ratio from harvesting the sum total of all resources in the fishery area. Supplementary regulations on the area and season of fishing may also be required; particularly where critical spawning habitats and areas/seasons of high vulnerability are concerned.

The framework for ensuring input of technical advice to management

48. The conventional framework for science-based management of marine resources is summarised in Figure 1 where several components of the fishery management system are illustrated:

a) The functions of sampling, statistics, environment and stock assessment committee(s) or standing working group(s) are desirable where the necessary human skills are available, as they provide a mechanism for peer review of the work of individual government fishery biologists and economists. The above functions may be divided up in various ways, and such committees could include members not only from the government administrations, but may also include experts from non-government institutions, NGOs and the private sector where available.

b) The sampling, statistics and assessment groups should be in contact with those responsible for control and surveillance, so as to receive input on the feasibility of the measures they propose, and from socio-economists to gain an impression of the impact of these measures would have on the fishery sector.

c) The measures proposed by government, before being implemented, should ideally be discussed with interested parties through a system of government-industry-interested party consultation, since without this, implementation may prove difficult.

d) Ideally, the work of the assessment scientists should be subject to quality control, to ensure that appropriate and up-to-date technical methods of analysis are being followed, so that the fisheries management authority can take measures with a reasonable level of confidence that they are based on appropriate analysis.

49. The subject areas typically dealt with by these groupings are shown along the top of the figure: the degree to which their deliberations are decisive with respect to the management measures arrived at, increases from top to bottom of the figure. Figure 1 b) shows an alternative format, in which the flow of management advice is as before (the quality control function is omitted on this figure but still assumed to occur). Here the normally dominant decisions of the Authority on management are now constrained by a management plan (see Annex 1), or by a Convention, which specifies which management actions are legitimate under circumstances where there is a high degree of risk of incorrect management leading to stock collapse, or where the stock is recognized to be

Coordination between States and with international fisheries management bodies

50. Coordination between States on management of shared, straddling and highly migratory stocks lying across maritime boundaries between EEZs or with the high seas, poses particular problems, stemming from the different legal status of the resource in different parts of its range. The UN Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks has emphasized the obligation of States to cooperate in information exchange, research and management, as established under the Law of the Sea Convention, and if necessary, to set up an international management body for this purpose. Despite the recommendation of the 1982 Convention, there is no binding obligation under international law for States exploiting a stock managed by a fishery commission on the high seas, to participate in its work, or to contribute to the cost of operations of the Commission, although this is clearly a precondition for responsible fishing.

FLEET SIZE AND EFFORT CONTROL

Effort control and the right to fish

51. Effort control and/or allocation of specific user rights are seen as being the key to proper resource management. A rigorous control of access is seen as essential to restoring a wide range of possible management options that have been effectively lost with excessive investment in the means of capture and with free access to the fishery.

52. Interested parties with a documented recent history of participation in the fishery cannot be arbitrarily deprived of the right to access to the fishery by the fisheries management authority without adequate compensation. The appropriate level of compensation should be a function of the net annual revenues from the fishery, and should be a subject for arbitration.

53. In allocating fishing rights, standards and limits should be set to avoid inequitable allocations. Especially in the absence of individual rights specified as individual quotas, the fisheries management authority should consider what technical criteria apply that can help to achieve this objective. The first step to doing this is to decide on the proper categorization of vessels and gears. The fishing power of a category of vessels does not necessarily remain constant and so needs to be kept under review.

54. In order to make it eventually possible to make measurements of, and control, the total fishing effort exerted, there must be a rough equivalence in fishing power between vessels in a particular class, such that differences in annual catch between vessels of a class are mainly due to different fishers' skills and time spent fishing, rather than technical differences in vessels and/or gear type.

55. Progress with effort control appears to depend on States and fisheries management authorities accepting several preliminary considerations:

a) The ease with which effort overruns can occur quickly compromises progress towards resource sustainability, employment in coastal communities and economic returns to the fishing industry.

b) Fleet size is easily increased if inadequate, but costly and difficult to reduce when economic and biological optima are exceeded.

c) For reasons given above, open access to marine fisheries is untenable, and some form of licence limitation is a precursor to adjusting the fleet to the capacity of the resource to sustain it.

d) Government plans for investment in the sector, even when based on a resource assessment, should seek to set modest intermediate targets for final fleet size, capacity and fishing power, while collecting information from which a better estimate of long-term sustained yield can be made.

e) Direct or indirect subsidies to the fisheries sector to counter low returns on investment almost inevitably result in overall losses to the sector as a whole.

56. A suggested approach to implementing limited licensing would be to establish national or regional fleet registries which list the port of operation and characteristics of the individual vessels, and assign them a unique licence number. The conditions for granting of a licence are spelled out, and form the main basis for the system of fisheries regulations in force. Once a limited licence system is established, attempts can be made to establish national and subregional databases on fleet operations. These data bases should be cross-linked to the fleet registries, and break down fleet performance seasonally by fishing gear and target species, in such a way that the data they contain can contribute to national planning by the fisheries management authority in cooperation with interested parties.

Fleet redimensioning

57. Mechanisms for reducing fleet size can only pass through a phase of limited licensing or access, and involve considerable expense. If not implemented carefully, the risk is run that occasional fishers and those outside the sector will be attracted into the fishery in the initial process of licence limitation. A further risk occurs in setting the conditions for licensing, that the minimum criteria for fishing gear and vessels may be "adjusted upwards" to account for the small number of more powerful fishing units, thus adding to the fleet horsepower as a whole instead of reducing it. (As noted in Boxes 6 and 7, effort control measures can also indirectly affect the susceptibility to capture of different sizes and ages).

58. The mechanisms involved in fleet reduction (buy-backs of licences; two-for-one swaps or "build down" of fleet horsepower, fishers' retraining in other professions; exchanges of licences for other means of productivity such as aquaculture leases), are expensive and often socially controversial, but appear to offer the only long-term prospects for maintaining an economically productive sector once effort levels have risen above those that can be sustained by the resource.

59. One important reason for giving priority to effort control and where necessary, fleet redimensioning, is that unless effort levels are moderate, technical measures involving at least temporary losses in earnings to fishers, will be very difficult to introduce.

TECHNICAL MEASURES

60. A variety of technical measures have been suggested which directly, or indirectly, can reduce negative impacts on the resource and hence improve sustainability of fisheries. From the perspective of their impact on the resource, a number of different technical measures have in common an effect of changing the fishing mortality experienced by the stock at different stages in its life history. It should be remembered when formulating management measures that there is no hard and fast line between technical measures and effort control measures. As illustrated in Boxes 6 and 7, both can have implications for size at first capture and fishing mortality.

Gear interactions and characteristics

61. In general, it is recommended that fishing by towed gear or gear making destructive contact with the bottom be allocated a low priority close to the shore, in shallow waters and in vegetated areas, or areas with important ecological communities such as coral reefs. Fixed gear and floating cage and aquaculture installations should be allocated particular areas where their operation must not be interfered with by mobile gear, but where the by-products of their operation will not damage naturally occurring resources. The areas and periods for operation of fixed gear should not be such that during periods of resource migration they continuously obstruct narrow channels or river mouths vital to the reproductive or feeding migrations of fish or invertebrates.

62. Fishing gear should not be discarded in part or as a whole to the water, especially if constructed of non-biodegradable materials. Such materials are not to be discarded, and with recovered gear lost by others, should be brought ashore and disposed of in a proper manner. Fishing gear such as traps or gill nets, should to the extent possible, be constructed so that they disintegrate with time into components that will not lead to ghost fishing.

Size limits and mesh sizes

63. Size regulatory measures are enshrined in the fisheries regulations of many countries, and in many cases were originally related to size at maturity, and in an ideal sense, this criterion is still correct and applicable today. Defining size limits nowadays, is however seen as linked to effort control. Without the latter, the low abundance of large fish may make size limits and/or corresponding mesh size regulations impractical and difficult to enforce until fishing mortality rate has been reduced and in consequence, the abundance of larger fish has increased. In the absence of effort control, the only measure that may ensure survival to spawning, is to set the effective size at first capture close to, or at, the size at maturity for the species in question. Such technical measures are especially important if there is no control of access to the fishery.

64. For trawl fisheries, a stretch mesh size of the cod end is usually seen as a point of reference, but in other fisheries, hook sizes, trap openings etc, may have an equivalent role (see Box 6). Some types of fishing gear may show much sharper species and size selective characteristics than others, and an important objective of gear design experiments should not be predominantly to increase fishing power, but to also increase selectivity. Following improvements of the design of gear along these lines, fishers should be encouraged to adopt more selective gear and fishing methods, and avoid areas with high by-catch.

65. In unselective fisheries (such as some fish traps in the tropics, and bottom trawls with fine mesh), the area and season of fishing, and the fishers' mode of deploying the gear may play the predominant role in determining the size and species composition of the catch, and this makes explicit reliance on single management measures less than practical. For gill nets, attention should be paid to the season and area of operation to reduce the probability of meshing sea birds, mammals and turtles. This should also be a consideration in the proper operation of other types of fishing gear and methods.

66. The survival to spawning, and the survival of new recruits to maturity are consequences of the net impact of gear, fishing strategy, fleet size, seasons and fishing areas, as well as of environmental conditions. The joint impact of all of these factors needs to be taken into account in designing a management regime for the fishery.

Box 6: Technical measures and effort control: Controlling mortality due to fishing by effort control in combination with technical measures.

The following simple equation shows how a variety of management measures can all achieve broadly comparable results in reducing fishing mortality on all or some size groups:

$$F \Delta t = \frac{q.a.f.}{A}$$

Expressed in words, this is equivalent to:

Effective rate of fishing on a size group of the stock =

$$\frac{\text{Gear efficiency (by size)} \quad X \quad \text{Effective areas swept by 1 fishing operation} \quad X \quad \text{No. times the gear is used in period } \Delta t}{\text{Area of the fishing grounds}}$$

Each component in the above equation has one or more equivalent. Measures that affect the effectiveness of fishing and influence the fishing mortality exerted (all other factors kept constant).

A. Δ t: the time spent fishing (fishing season)	1. By controlling Δ t: the season length, if the fleet effort per day is unchanged,
	2. Other measures such as closures on weekend fishing enter this category.
	3. If fishing is restricted to a period of the year when juveniles are not available, then imposition of a closed season may be equivalent to the imposition of a size limit.
B. q: the efficiency or selectivity of the fishing gear	1. Gear regulations such as those on mesh size, headline height, or even the use of Decca/Loran navigators or sounders all affect q, as do skipper skills.
	2. Size limits may also enter here, since these affect the areas fished by the fleet, depending on the distribution of fish of different sizes. The fleet may then avoid areas where young individuals are abundant, hence reducing juvenile q (and increasing adult q).
C. a: the area affected by 1 unit of effort	Measures that result in a large effective area of action of the gear are included here; such as trawl width, individual engine horsepower, length of gillnets/longline hook number plus hook spacing, etc.
D. f: fishing effort measure	The number of hours/day fished and the effective fleet size/fishing area, in combination, are related to the fishing mortality suffered by the stock.
E. A: the area of fishing grounds/stock area	Certain areas in the stock range may, of course, have high juvenile densities; closure of these is again equivalent to imposing a size limit.

Box 7: Technical measures and effort control: The pros and cons of various measures whereby the control of size at first capture is achieved by various fishery regulations

PROS:	CONS:
A. By simply reducing fishing mortality for all ages, by means of quotas/effort control:	
- By increasing survival and hence mean age, this increases also the mean size at capture, as well as the catch rate and the economic return to the fishery.	- Requires government action in setting conditions of restricted access/effort limits.
B. By a regulation prohibiting landings or sale of undersized fish:	
- In theory, can be individually adjusted for the different species in the catch and their market values, and/or conservation needs; leaving the decision on optimal capture method up to the fishermen.	- In multispecies fisheries, and where small fish cannot be avoided in the catch, it leads to discarding practices, or to the illegal marketing of undersized fish. Usually considered economically inefficient.
C. By mesh size regulation:	
- In theory, increases the size at first capture of trawl-caught species and, in most cases, increases the overall yield per recruit from demersal stocks.	- In a multispecies trawl fishery, some smaller species (e.g. Sepiolidae, shrimps), economically valuable locally are partly lost with larger mesh sizes. Requires close monitoring of fishing gear.
- In the case of larger species, movement from smaller meshes to a larger mesh size would, in theory, allow more mature individuals to spawn before reaching the size at first capture.	- A given mesh size affects all species caught in the trawl, whether optimal or not. - There is a short period of lower catches before the predicted yield increase shows up. - In practice, larger mesh trawls tend to be more efficient, thus increasing effective fishing effort, unless this measure is accompanied by effort control.
- Mesh size regulations may be relatively easily enforced if applied to all fisheries simultaneously. If seasonal exceptions are allowed for fishing small species, these should ideally apply to all boats and areas, with a prohibition on landing larger species during the period.	- Difficult to enforce if exceptions are allowed for particular fisheries. - Where there is a high diversity of gear types, regulations on gear design become costly, if not impossible, to enforce fully.
- Sorting is facilitated by reducing labour (fatigue and thus costs).	- The netting material used, the hanging ratios, the netting shape (e.g., square or diamond-shape); all affect the selectivity characteristics of the net. (Regulations can be circumvented, e.g., by using double or loose netting).

67. Standards for gear design need to be set by the management authority, but exceptions may be granted to an overall gear configuration, only when a good justification is provided. The authority should keep a record of fishing operations by fleets registered to fish in its area.

68. Exceptions to national or regional gear configurations and restrictions on the type, area and season of a fishery, should only be granted if justified by specific arguments, which spell out their potential impact on the juveniles of non-target species sought as adults in other fisheries, on spawning aggregations, and on endangered species and threatened or fragile ecosystems.

Managing multispecies resources

69. Many fishing gears catch several species and sizes of fish simultaneously: this leads to two types of problems; technical interactions and species interactions. With respect to technical interactions, attempts to improve the selectivity of fishing gears, methods of fishing and seasons and areas of deployment, can reduce the by-catch and discard problem, and should be encouraged, but are not likely to eliminate it completely. Some types of gear are much less selective than others, and their use should not be encouraged where practical alternatives exist. Arranging comparative studies of by-catch under different fishing methods, seasons and design of the gear, falls within the responsibility of the fisheries management authority, and the results of these trials should be analysed and made available to the public. Some of the species caught incidentally to the target species have commercial value: others will have commercial value only after further growth in size. In general, most discarded fish and invertebrates die in discarding, and this represents an economic loss and potential ecological impact on these resources and others that feed on them. In particular, some by-catch species are protected resources whose capture is forbidden.

70. There is also a need to consider species interactions, particularly between predators and their preys, and between competitors at the same level in the food or trophic web that represents the linkage between different species in an ecosystem. Trophic models are becoming a recognized basis for reconciling the management targets for different species in a given fishing area which are linked in this fashion, since removal of an excessive amount of predators or prey will have an unbalancing effect on the species to which it is linked in the food web. Some predators have a high value such as groupers or halibut, and may be negatively affected by high levels of exploitation of their prey. Current practice, although still largely empirical, is moving towards the allocation of a part of the prey production to these valuable predators before harvest allocations of prey species are decided upon. (Other considerations related to multispecies resources are mentioned in the guidelines on Integrated Coastal Area Management).

71. In practice of course, no stock is independent of all other species in a marine area, or unaffected by other fisheries. In the multispecies context, however, it was soon recognized that it is not possible to maximise the yield from each stock simultaneously. If such multiple single species analyses are the sole basis for management, managers will soon be forced to decide on an overall criterion that subordinates individual assessments and species catch recommendations to the needs of, and overall economic yield from, the ecosystem and fishing area as a whole. One possibility would be to aim to maximise the overall yield in terms of weight or value, but this would inevitably imply losses to some fleets which may be socially or politically unacceptable. It is for this reason that some prior negotiation between interested parties should lead to an agreement on the relative importance of the individual resources, and decide on fishing strategies and rates of removal that favour as a minimum, the preservation of biodiversity. If at all possible, managers and interested parties should meet to decide on the relative importance or size of harvests of different species in the area in question in light of the maximum overall yield and ecosystem stability, and how these objectives can be maintained or improved.

Closed areas and seasons, and conservation of biodiversity

72. Closed seasons and areas can be important for protecting spawning and nursery grounds and other critical habitats and vulnerable stages in fish migration, and for cushioning the impact of fishing, particularly on juvenile fish, especially given largely non-existent or ineffective effort control measures in many countries.

73. Closed areas/seasons are seen as important for a variety of reasons, including avoidance of the loss of economic yield when fish condition and price is low, to protect spawning aggregations and juveniles in areas/seasons of high vulnerability, or to avoid large by-catches of non-target species.

74. One type of permanently closed area is often referred to as a marine park or reserve. The argument for setting some areas aside as marine parks or reserves is becoming more widely recognized, and includes the conservation of biodiversity, and protection of a small but important proportion of the brood stock. The critical size of such a reserve needed to achieve these objectives may however be much larger than is generally the practice in most areas of the world. Alternative strategies for using time/area closures need to be developed experimentally, such as rotational closures. These may have particular value for sedentary or territorial species with low rates of population replenishment, and for which the period of rotation should reflect the rate of population replenishment.

75. The argument for the conservation of marine biodiversity has relevance to fishing activities (notably the effects of trawling on critical habitats and fragile biotopes, such as those dominated by epifauna and epiflora), and to the incidental capture of marine mammals and turtles. At the same time, the overriding impact of land-based effects, and the introduction of harmful exotic species, are often mistakenly seen as largely extrinsic to the effect of fisheries, but may be more deleterious in the long-term. Examples here have been the progressive introduction of harmful exotic species from elsewhere in the world into new marine habitats as a result of careless aquaculture introductions, through man-made canals, and/or from untreated ballast water of ships. Where a case is being made for introduction of a commercially valuable exotic species into a marine environment, this should be done only after quarantine procedures have eliminated the risk of introducing diseases, and only after agreement of other States in the same area.

THE FORMULATION OF MANAGEMENT MEASURES

FISHERY STATISTICS AND RESOURCE MONITORING

Data collection

76. The central importance of accurate fishery statistics and research information to analyses aimed at determining the current state of the resource and its capacity to support exploitation needs to be recognized.

77. Reliable data on discards are essential but rarely available. Some states and regional fishery agencies currently obtain discard data from observer programmes, and the use of observers is the optimal way to obtain such data. Discard statistics should be collected by national authorities and regional fishery agencies and, where possible, their collection or validation should be through the use of observer programmes.

78. A minimum statistical requirement for catch reporting should be the provision of nominal catch[2] in terms of weight or numbers together with factors which allow the numbers to be converted into equivalent weight. The nominal catch statistics should be accompanied by discard statistics and both should be specified by species, flag of vessel, gear type, FAO major fishing area (or as close an approximation as is possible), time and stock. These are required so that the total quantities of fish removed as a result of fishing activities can be specified. For areas where regional fishery agencies have responsibilities, the "stock" is as determined by those agencies. For areas where no regional fishery agency exists, it is recognised that stock data may not yet be available. The time unit used for reporting these nominal catch and discard data should be a calendar year or shorter time period. For seasonal fisheries which straddle two calendar years, the statistics should be provided both in terms of calendar year and fishing season. The nominal catch and discard statistics reported should correspond to the total catches (retained and discarded) for the relevant country; therefore, any statistics obtained by means of sampling rather than census should be raised to the total.

79. Minimum statistical requirements should also be agreed for fishing effort and associated data on catch rate or catch per unit effort. Effort data are required for three main purposes: (i) for assessment purposes as an index of fishing mortality and for deriving abundance indices, (ii) for economic analysis, and (iii) for management purposes. For effort and associated catch rate data, a finer level of spatial and temporal detail is required than for the nominal catch and discard statistics.

80. A standard classification of fishing gears and associated units of effort will need to be made (such as that shown in Annex 3). The catch (fish and non-fish) associated with the effort unit should be reported as nominal catch in terms of weight or numbers together with appropriate conversion factors, and with corresponding data for discards. Catches should also be reported and classified as retained catch or discards, as appropriate. The catch data by species and associated effort should be reported by flag of vessel, vessel size class, gear type, area and time. The area and time strata cannot be specified in general terms because the requirements will vary greatly depending on the geographic distribution and seasonality of the fishery. The area and time strata should be adequate to describe the fisheries in sufficient detail, to identify stock structures, to permit the calculation of fishing power, and to separate high seas and EEZ components of the fisheries.

81. Biological data are essential for stock assessment purposes and should be included in the minimum requirements. Length compositions or weight compositions with associated weight/length conversion information should be included in the minimum requirements for retained and discarded components. For some stocks or species additional data on sex, age, and maturity, are required for assessment purposes, and in such cases these data should also be included within the minimum requirements. Support to stock assessments and the undertaking of relevant research, including tagging experiments, surveys of abundance, biomass surveys, hydro-acoustic surveys, research on environmental factors affecting stock abundance, and oceanographic and ecological data, are also very important.

82. Vessel data are important for management purposes and for the verification of catch and effort data. These essential items are:

(a) name of fishing vessel, registration number, previous names, and port of registry;
(b) previous flag (if any);
(c) International Radio Call Sign;
(d) name and address of owner or owners;
(e) where and when built;

---

[2] For all species retained, irrespective of whether they are target or non-target species.

(f) type of vessel;
(g) length;
(h) vessel marking.

Confidentiality and verification of data

83. National authorities and regional fishery organizations have clearly established policies and standards with respect to maintaining the confidentiality of catch and related data. Such confidentiality is essential to (i) maintain the full cooperation of industry and national statistical reporting offices in the provision of timely data, and (ii) to ensure the reliability of data.

84. The verification of data supplied on fisheries is essential at regional and national levels. Because of wide differences in types of fisheries, however, it is of little practical value to recommend any particular verification procedure. Furthermore, different types of verification may be needed for the magnitude and distribution of catch and effort, for reports on discards and for species identification. A number of possibilities for verifying fisheries data are however suggested for use in different situations. The possibilities include:

a) checking logbooks against landings data (e.g. sales notes);
b) sampling catch for species composition;
c) airborne and shipboard surveillance, associated with the boarding of vessels;
d) observer schemes;
e) comparison of landings statistics with certificates of origin, trade and production (e.g. processed fish) statistics and similar sources of information;
f) reporting from sea of retained catch on entering and leaving the high seas (or other administrative) zones;
g) the development and implementation of vessel monitoring systems utilising transponders to monitor the position, catch and other activities of vessels;
h) inspection of data collection methods by statistical staff; and
i) interviews with fishers.

85. While the responsibility for collecting fishery statistics resides with the fisheries management authority, it is also desirable to maintain the independence of research and statistical agencies on the one hand, and enforcement agencies on the other. Although redundancy in data collection should be avoided, multiple sources of data should be compared where they exist.

Timeliness of the submission of data

86. The timely provision of data is necessary for assessing the status of fisheries resources and for determining the adoption of appropriate management measures. While practical difficulties are faced by national statistical reporting offices and management authorities in collecting and collating data in a timely manner, every effort should be made to ensure that the current data reporting requirements are met.

87. For fisheries under management, it is desirable to have real time data. The importance and value of data transmission by radio, fax or transponders installed on fishing vessels should be recognized.

88. The quality and timeliness of the submission of data is essential for the rational management of fisheries resources, and in the absence of such data, proper management of resources cannot be assured.

Costs of collection, collation and dissemination of data

89. Every effort should be made to minimize the costs of collecting, collating and disseminating high seas catch and related data. The duplication in the collection and collation of data is costly, and arrangements for information exchange between adjacent authorities should be strengthened or established.

MANAGEMENT APPROACHES

The duty of care

90. The management authority should exercise its "duty of care" for the state of the resource and avoid negligence in decision making. In exercising its duty of care, the management authority should ensure that important aspects of the biology and ecology of the species under its control are understood, and make provisions for research on relevant aspects.

91. A management authority should ensure that the state of the resource is monitored, using statistically sound techniques, and that a statement of the state of the resource and of the fishery (its participants, and the number and type of gear and vessels) is made at regular intervals. This should include making available such information in appropriately summarized form to the public sector.

Management consultations

92. The importance of support to the management regime by fishers requires that they participate in some way in deciding on the objectives of the fishery, the management regime and the concrete measures adopted, but also have certain duties to protect the resource and provide accurate information, and respect the regulations agreed to. In this context, States may consider enacting in their national legislation provisions establishing a duty of care owed by fishers towards the proper use of the aquatic living resources, with the possibility of legal liability for breach of duty.

Precautionary approaches

93. The consequences of the proposed management measure being in error should be judged based on conservative (precautionary) approaches, but ideally based on a formal stock assessment using commonly accepted methodologies. This assessment should incorporate a statement of the likely bounds of errors in the various estimates of harvests that it makes, corresponding to the reference points it is asked to refer to. It should also incorporate where feasible, an estimate of the risk and consequences of errors on the management measures proposed. A "reasonable" assessment of the state of the stock and its likely error margins may not be precise, but the method used to derive the estimate of (e.g.) biomass, appropriate fishing intensity, and likely magnitude of error should be transparent, and reflect commonly agreed on procedures. Full documentation should be provided if a new assessment methodology is provided, with an explanation of why it is preferable to use it over the best alternative established assessment method.

The role of fisheries research

94. Fishery management bodies are strongly advised to seek the best scientific advice as a basis for making management decisions, and in some regions of the world, a situation has existed where the only objectives formulated for management have been those related to the state of the resources as specified by fishery biologists (e.g. fishing at F_{MSY}, $F_{0.1}$ etc). This advice in the past may have substantially ignored socio-economic considerations and the factors underlying fleet dynamics, and

these considerations should be given attention. Biological studies of fishery resources have not always been linked to applied issues, and as a result, research has often in the past been without clear formulation or relevance to the management objectives in the fishery sector.

95. In the single species context it is theoretically possible to maximise the long-term yield from a stock by selecting an appropriate level of fishing mortality, and the achievement of this rate of harvesting could be a management objective in itself. Biologically-based fisheries management measures have traditionally been founded on scientific analyses, often set in a single-species context. As our understanding of the interactions between resources and fisheries has progressed, these interactions between predators and prey or competitors, or effects due to indirect impacts of fisheries for one species on another: (the so-called "trophic interactions" and "technical interactions"), have begun to demand more attention from managers. Finally, but not of lowest importance, research should be supported on natural and man-made fluctuations in environmental conditions that can help forecast changes in stock abundance with time.

Decision-making process

96. Fisheries management authorities should employ effective decision-making processes, and should consider alternatives to regular renegotiation of management measures (see Box 8).

Obsolete fishery regulations

97. Regulations that are obsolete, unenforceable or not respected by fishers, but are still "on the books" discredit the efforts of the management authority, and need to be reviewed, and their cost\benefit ratio established. In setting management measures, the managing body should evaluate first the impact of these new measures on the resource. It should also consider the costs of enforcing the regulations, and their long-term impact. The fisheries management authority should regularly review the provisions controlling management of the resource to determine their adequacy. Those that are no longer useful or have been superseded by more effective measures, should be cancelled in order to avoid confusion and ambiguity in the management approach, and in order to avoid the other provisions of the code falling into disrepute.

Review of fishery management

98. In evaluating the performance of a fisheries management authority, States should set up review procedures to meet at intervals of several years, to investigate the performance of these bodies and their component committees and working groups.

STOCK REBUILDING POLICIES AND RESOURCE ENHANCEMENT

99. In this section, it is assumed that we are discussing actions to take in the case of depleted stocks and/or their degraded environments, to restore them to health and productivity. Stock rebuilding measures, particularly for many groundfish stocks, should place priority on redimensioning fishing capacity towards long term fishing opportunities. This process will probably require extraordinary one-time management actions that fall outside the provisions and financial means available to the fisheries management authority. Time spans for stock rebuilding are presented in Box 9 and the critical stages are discussed in Box 10.

Box 8: The resource management process

The lack of success which fishery management bodies have had in agreeing on management objectives due to conflicting interests, might be reduced to some extent, by developing a model of the decision-making process in the fishery. Such a mathematical model could incorporate both the regularly updated status of the stock, the fleet dynamics, the management measures agreed to, and the management process and its implementation. Once it is verified that the model provides a realistic description of the fishery, such a model can be used in simulation procedure to test the consequences of different objectives such as stock conservation, maximizing economic and physical yield, population stability, etc. Such models can also play an important role in predicting the consequences of different objectives, and determining which of them would be generally acceptable (or result in the minimum losses, or equally-shared gains) to all interested parties concerned, and in evaluating the risks of different management measures on the future state of the resources.

Using a model of the fishery as a basis for management reduces the need for arbitrary decisions, since once the framework and 'rules' for such a system are agreed to, the management measures follow more automatically from the state of the resources as given in the updated stock assessment. Such a system has recently been adopted by the International Whaling Commission for managing whale harvesting but it has not yet been used because the moratorium is still in place. Similar systems have also been applied for the management of anchovy and hake off South Africa.

100. In the case of stock declines due to human impacts on the environment or critical habitat of a species, the State may wish to encourage the recourse of interested parties affected by environmental degradation to redress by the courts. This will only be possible however if explicit user rights have been allocated, and this is itself an incentive for the State to provide such rights.

Some future priorities for fisheries management and stock rebuilding

101. The diagnosis of major overinvestment in world fleets, and overexploitation of groundfish stocks in many areas of the world, was arrived at by FAO on the basis of reported world fleet and catch statistics for marine fisheries. *De facto*, fishing mortality rates of groundfish stocks are often equivalent to at least 40-60% per year, with a very small proportion of new recruits surviving to spawning. Areas of ocean where fishing pressure is low are now negligible, especially on continental shelves where the important groundfish stocks are found. This diagnosis has been reinforced by recent events in many national fishing zones, and by the conclusions of the UN Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks. Both have recognized *de facto*, that the exploitation of highly migratory and straddling stocks, within EEZs and on the high seas, is not constrained to safe levels by current fishery management systems, where these have been set up. A precautionary approach is called for, with adherence to responsible fishing and management practices.

Box 9: Some rough time spans for stock rebuilding

It may be useful here to provide some indication of the time span needed for stock rebuilding: one very rough rule of thumb suggested here, for reasons discussed in Box 10, is that the stock recovery time is unlikely to be less than two generations of the exploited population, where a generation time may be considered roughly equivalent to the time from egg to maturity, but should not greatly exceed this period. The table below gives some very approximate estimates of the duration of this period for a number of common groups of exploitable fish and invertebrates; (these estimates must of course be refined by research on the fish stock in question). For reasons of the wide variability of recruitment from year to year, and the requirement that successful spawning coincides with favourable environmental conditions and reduced predation on young fish, stock recovery may not be assured within the above period, and it will be necessary to monitor closely the changes in biomass while maintaining fishing effort levels at a low level. At the same time, experience shows that only slight reductions in fishing effort will not achieve stock recovery even in the long term, since they will be nullified by the effects of continued improvements in fishing efficiency and the rapid technological change that continues to characterise modern small and large scale fishing vessels and gear.

From the following table it must be clear that many demersal finfish of temperate, Arctic and Antarctic seas, may grow and mature very slowly, and hence have a relatively low natural resistance to heavy fishing and relatively long recovery times during which fishing effort will need to be maintained at a low level.

Some orders of magnitude for generation times of living marine resources under unfished conditions

1 Generation (yrs)	< 1-1yr	2 yr	3-4yr	5-9yr	10-15yr	> 15yr
Squids, penaeid shrimps	X	X				
Small Pelagic fish	X	X				
Tropical bottom fish	X (**)	X	X	X		
Cold-temperate & deep water bottom fish		(X)	X	X	X	X (*)
Macrobenthos/ Shellfish/ Larger Crustaceans	(X)	X	X	X		
Larger Pelagic fish		(X)	X	X		
Marine Mammals		(X)	X	X	X	

FOOTNOTES: (X) uncommon

(*) Deep water fish such as orange roughy, and (anadromous) species such as sturgeons, may become sexually mature at a late age, and have life spans approaching 100 yrs.

(**) e.g. small tropical fish such as slipmouths (Leiognathidae).

Box 10: Critical stages of stock rebuilding

During the decline and depletion of an overfished stock, it has often been observed that at least one larger than average year class may be generated from a small and still declining stock size. It is frequently assumed that this good year class which dominates the age composition of the stock (and in absence of competition may show better than average growth), has resolved the problem of stock recovery, and that normal levels of fishing can be resumed. In fact, even with quota or effort control, this year class is usually vulnerable and targeted, and may be subject to heavy discarding as it recruits to the fishery. Thus, this unexpected, (and possibly final) opportunity to obtain a relatively painless stock recovery is wasted as a result of the dominance of short-term interests.

A recovered stock is not one consisting predominantly of a single year class, and although the following aspects are difficult to document, a precautionary approach would assume that a resumption of normal rates of fishing will lead to a high risk of the loss of the often important spawning contribution of rarer older fish, as well as to a possible loss of genetic diversity of the population.

It is postulated here that following precautionary principles, a policy of stock rebuilding cannot be considered successful, and normal fishing levels should not be resumed, until the first year class generated subsequent to this policy coming into force, has itself generated one respectably large year class: further, that this second year class has reached commercially exploitable sizes. In other words, a consistent policy of stock rebuilding should be maintained over at least two generations, or until the stock is capable of yielding the former estimate of Maximum Sustainable Yield without compromising the future replenishment of the remaining resource.

Alternatives may be suggested for the level of fishing mortality during stock recovery, from a complete moratorium on all fisheries catching directly or incidentally the stock in question to a low level of fishing. How low this level should be depends on the rate of population increase of the species in question, and the importance accorded to rapid stock recovery, but practical experience would seem to show that stock recovery at fishing mortality rates even as low as F(0.1) * cannot be assured.

[An arbitrary standard suggested here, is that if a complete cessation of fishing is considered impossible to enforce, the exploitation rate to be maintained during a stock rebuilding policy should be such that less than half of the stock initially present dies of fishing during the course of a generation].

102. Particularly for many groundfish stocks, a priority must be placed on fleet redimensioning and stock rebuilding, and a number of priority actions seem called for:

a) The fishing industry and fishers should attempt where possible to demonstrate good stewardship of the resources on which they depend for economic survival on behalf of the countries they represent, and on behalf of future generations of fishers. In the absence of such good stewardship of resources within national jurisdiction, they risk losing their role as spokesmen for the living marine resources to other groups whose interest in the resource is not tied to optimal exploitation.

b) Where these exist, subsidies for fleet construction, low costs of fuel, fishing gear, etc should be eliminated. Access to the fishery should be permitted through a fishing licence that is conditional on following responsible fishing practices. Replacement of vessels fishing depleted stocks should be accompanied by a scaling down in fishing power of the new vessel, buybacks, 2-for-1 licence swaps, etc.

c) Where quotas or fishing effort limits have been ineffective in controlling increases in fishing power, even when they have been aimed at stock rebuilding strategies (such as the F 0.1 level), a fishing strategy that is designed to achieve significant stock rebuilding over a period equivalent to no more than two generations (double the mean age at spawning) should be aimed for. One arbitrary criterion of such measures, would be to immediately increase survival to spawning by 50% over current levels. These strategies should aim for the most rapid rebuilding possible by taking full advantage (when these occur) of favourable year classes, and ensuring at least a 50% increase in their rate of survival.

d) If it proves impossible to control fishing effort to levels which cannot increase survival to mean age at spawning, alternative or supplementary efforts should be made to increase survival to spawning of a significant part of the population by means of area closures of a significant proportion of the fishing grounds, on at least a seasonal basis, and/or by protection of spawning areas, and areas where juveniles and prerecruits are abundant. These closed areas or refugia should not be token or local in extent, but should be designed to improve survival to spawning by at least 50%.

e) Greater transparency in fishing operations, reduced waste of unused resources, more selective fishing practices (reduction of unwanted by-catch and discarding) and more accuracy with respect to statistical reporting, are all required in exchange for the privilege of being included among those having limited access to marine resources. Some form of reporting that is not voluntary, such as telemetry of vessel operations may be required.

Resource and habitat restoration and enhancement

103. The fisheries management authority and the interested parties have a joint responsibility to future generations of users of the resource to ensure that it and its habitat is conserved and where possible enhanced; that biodiversity is conserved; and that critical habitats not be reduced to an extent that they place the continuity of a commercially viable resource in danger.

104. The enhancement of the productivity and biodiversity of marine habitats can be achieved by carefully planning interventions in the coastal zones, such as protecting or enhancing seagrass, mangrove or seaweed beds, adding artificial habitats or shelters for fish and shellfish, and providing technical input such that engineering works that may directly or incidentally affect fishery habitats are properly designed.

DISPUTE SETTLEMENT PROCEDURES

Negotiations between interested parties, and with new entrants

105. The fisheries management authority should provide a forum for the negotiation of conditions of fishing between competing interested parties so that marine harvests can be extracted in an orderly and controlled fashion. These negotiations should recognize that interested parties that have a continuity of following the rules set by the management authority have the right to be assured that any management measures or conditions of access do not discriminate against them with respect to other interested parties. At the same time, explicit procedures need to be instituted to allow for new entrants to the fishery who have a legitimate right to do so. It will be inevitable however that in a fully exploited resource, these new entrants will only be able to enter if it is considered safe to allow some increase of exploitation rate, or if the existing participants reduce their level of exploitation correspondingly. In this second case, the management authority may wish to ensure that the sacrifices made by existing interested parties are compensated in some way by the new entrants. Clearly, this type of procedure must be instituted, since illegal fishing by parties who do not recognize the management authority should be subject to sanctions to be decided on by States in consultation with, or at the discretion of the management authority.

Provisions for dispute settlement

106. On occasions, the decisions of the management authority will not be accepted readily by one or other interested party. Under these circumstances, recourse should be made to dispute settlement procedures. Before an interested party is guaranteed the right to participate in the fishery, they should deposit an instrument of agreement by which they promise to accept binding dispute settlement by a third party agreed between themselves and the management authority. This third party should be nominated in advance, and be required to show evidence that they do not profit from the affairs of any of the interested parties.

IMPORTANCE OF FISHERY MONITORING, CONTROL AND SURVEILLANCE FOR MANAGEMENT

General Considerations

107. The overall objectives of monitoring, control and surveillance (see Chapter of the Code) need to be carefully defined and evaluated with regard to each State's special situation. States must determine the relative importance to them of monitoring, control and surveillance for the purposes of: (a) maximizing net benefits from the fishery resources in their zones, with regard to domestic and/or foreign fishing; (b) maximizing net benefits from other resources and uses of the zones (e.g. minerals exploitation); (c) implementing customs and quarantine regulations; (d) producing information on quantity and value of resources; (e) meeting domestic fishers' demands (realistic or not) for protection from foreign fishers; (f) exercising national sovereignty; (g) enhancing navigation, search and rescue services; (h) protecting the marine environment; and (i) other. Evaluation of the importance of these objectives will help determine optimum kinds and levels of investment in monitoring, control and surveillance.

(i) Monitoring involves the collection, measurement and analysis of fishing activity including, but not limited to, catches, species composition, fishing effort, discards, area of operation,etc.

The above information is primary data that fisheries managers use to arrive at management decisions. If this information is unavailable, inaccurate or incomplete, managers will be handicapped in developing and implementing management decisions.

(ii) Control involves the specifications of the terms and conditions under which resources can be harvested.

These specifications are normally contained in national fisheries legislation and other arrangements that might be nationally, sub-regionally or regionally agreed to. The legislation provides the basis for which fisheries management arrangements, via MCS, are enforced. For maximum effect legislation should be flexible (to cater for different and changing circumstances) and easily enforceable.

(iii) Surveillance involves the checking and supervision of fishing activity to ensure that national legislation and terms, conditions of access, and management measures are observed.

This activity is critical to ensure that resources are not overexploited, poaching is minimised and management arrangements are implemented.

Copyright material

ANNEX 1

OUTLINE FOR AN ARRANGEMENT (CONTRACT) BETWEEN THE INTERESTED PARTIES AND THE FISHERIES MANAGEMENT AUTHORITY:

THE CONCEPT OF A FISHERIES MANAGEMENT PLAN
THE CONCEPT OF A "FISHERY MANAGEMENT PLAN" AS A CONTRACT BETWEEN STAKEHOLDERS AND THE FISHERY MANAGEMENT AUTHORITY

PREAMBLE

It is axiomatic now that fishery regulations should be compatible and should reconcile the needs of the Stakeholders and the ability of the resource to sustain fishing. Such a set of regulatory measures is essential to proper development and conservation of wild resources. It is also evident that new regulations, the rationale for which has not been accepted by fishermen, will have little chance of success. In this case, even if the Fisheries Management Authority expends considerable resources in trying to ensure that ineffective or poorly formulated regulations are adhered to, this will probably be in vain, and this encourages the attitude that all government regulations are to be circumvented, if possible.

In many jurisdictions, fishermen have a high degree of autonomy and arbitrarily-imposed regulations will not be accepted, and can usually be circumvented, even if policed carefully. Regulation by consensus is usually the best approach, and here the concept of a "Fishery Management Plan"; a public document agreed to by governments and industry, forms a useful framework for cooperative action. Fishermen also have to be provided information on their resources and the measures necessary for their conservation, that will enable them to appreciate the importance of such regulations as effort control, closed seasons, mesh sizes, size limits, etc., and will encourage them to abide by them. This requires good extension workers, and some degree of formal representation by fishermen to government; perhaps most logically, involving fishermen's associations or through representatives of coastal communities.

The geographical scope of the Plan should be well defined: local resources such as shellfish and those resident on reefs and other local fishing areas year round can most efficiently be dealt with by local administrative units, and restricting access to local fishermen is usually desirable if overfishing and conflicts over resources are to be avoided. There are good precedents for these local management areas throughout the world where e.g., separate lobster fishing districts and locally-managed clam beds or oyster leases exist.

It is also logical that the more migratory resources, e.g., of pelagic fish, need to be regulated by larger districts, nationally or internationally, as their stock range dictates. Here, specific regulations for larger traditional or semi-industrial scale boats and traditional inshore fishing vessels, and their relative access to the resource may be required, so as to avoid gear conflicts and preserve the equity of the different participants in the fishery.

An understanding of the nature of a resource and the problems involved in best using it, has to be shared in common between the harvesters of the resource, other stakeholders who have non-exploitive uses in mind, and the Fishery Management Authority charged with protecting it for the benefit of all Stakeholders. Only if such an understanding has been reached on the basis of the best available information, can a plan of action be developed that everyone accepts. At the same time, the urgent need for conservation of the more vulnerable resources means that fisheries regulations cannot wait until all information is available, but should evolve as new data and experience accumulate.

Management plans are drawn up by many countries for their fisheries, but in many cases the plans, and the reasons for developing them, are known to only a few officials, and not widely distributed in the public domain. This may lead to difficulties if the provisions of the plan are not understood by those most affected, namely the fishermen. Ideally then, the plan should be a public document that has been discussed with those most involved in the fishery, namely the stakeholders, and in fact provides a common consensual framework for future consultations, as well as explaining the long term objectives of the Fishery Management Authority.

It should, in effect, be a formal contract or understanding between the users of the resources, and those having the appointed role of seeing that national resources are used wisely.

UNDERLYING CONSIDERATIONS IN PREPARING A FISHERIES MANAGEMENT PLAN

Several of these have been put forward which can of course be modified depending on the national policy in resource management. However, some that appear fundamental are:

(a) conservation measures should ensure the survival of the species, maintain biodiversity, and as closely as possible, maintain the resource and its environment in a condition that allows the optimal economic yield to be taken;

(b) conservation and management measures should be based on the best scientific information available;

(c) information on all aspects of the plan may not initially be equally good, scientifically speaking. This should not prevent a best evaluation being arrived at as to the kind of measures that need to be taken to preserve the fishery from dangerous future trends. Such "preventive measures" are likely to provide time for a proper investigation to be made, and should follow a precautionary approach;

(d) following from (c) the management plan should be regarded as continually evolving, by a process of research and consultation, in such a way that its provisions are being continually perfected. This, however, means that new provisions should be introduced only after careful consideration of their impact on the target resource;

(e) to the extent possible, management measures on a resource or on closely interrelated resources should be coordinated over their whole range. This should include some method of consultation on common fishery policy for resources extending into other (national or regional) jurisdictions.

(f) for intertidal and subtidal resources close to the shore, management will be more effective if implemented by districts that as closely as possible reflect natural resource units, as well as administrative or population boundaries for the fishermen's communities involved. In order to achieve improved efficiency and local information flow, it may be advisable in the case of local resources, for the State to delegate the responsibility for preparing the local management plan, within specified constraints, to an administrative district or entity within whose district the stock boundary lies.

(g) the management plan should allow for natural variations in abundance over the resource.

Several other elements might be considered for inclusion in the Plan, or may be given different degrees of priority, depending on governmental policy and political philosophy, but may not all be fully achievable simultaneously, namely:

(h) the fishery plan shall promote efficiency in the utilization of fishery resources, within the constraint that major adverse effects on fishermen should be minimized or avoided;

(i) the fishery plan shall give priority to those fishermen now gaining a major part of their livelihood from fishing the resource in question, and take into consideration the traditional approaches to fishing, as long as these are not harmful to the resources;

(j) conservation measures shall, where possible, avoid duplication and adverse impact on other marine resources and their users (and, of course, vice-versa).

ADOPTION AND COMPONENTS OF THE MANAGEMENT PLAN

- The Plan should specify the resources to be managed and its geographical area of action.

- The Plan should specify who are the stakeholders in the resource; the nature of the Fishery Management Authority which will implement it or need to be consulted in its development.

- The Plan should spell out the Consultative processes during the Adoption of the Plan, and during its Implementation, and should indicate what is the duration of the Plan and the time frame and procedures to be adopted to renew it before it lapses.

- The Plan should specify the purpose of the Plan, its likely impacts, and the consequences if not adopted.

- The plan should provide necessary background information such as:

  specifying what are the biological characteristics, life history parameters, migrations, preferred habitat and distribution pattern of the plan, and its ecological relationships with other species dependent on it, and on which in turn it is dependent. Any particular critical stages of the life history or fishing areas, when or where the resource is particularly vulnerable to human intervention should be spelled out.

The current and historical abundance of the resource should be described, as well as the history of its exploitation, the type of gears and fishing vessels that have been exploiting it, their cost and likely life span.

The number of fishermen exploiting the resource directly or incidentally; their location by port; their predominant fishing grounds, the seasonality if any of their operation; the storage and handling practices now in effect; and the seasonality of demand and of prices received at dockside.

- The Plan should be based on an up to date assessment of the resource: its biomass, spawning stock size, current natural and fishing mortality rate
- The Plan should list existing and proposed fishery regulations, including legal fishing gear and vessel specifications, minimum sizes and conditions of fish for capture, sale and export, closed seasons and areas with their boundaries and their purpose, special regulations for protected species taken incidentally to their capture, and other technical measures.
- Provisions should be made under the Plan to regularly assess the quality and type of data being gathered on the fishery, which will allow the appropriate evaluation of the resources to determine safe harvest levels, to determine the socio-economic status of those employed in the industry.
- The Plan should specify minimum requirements for control and surveillance of fishing operations, proper reporting of areas and catches by participants, and product quality.
- The Plan should specify the consultative framework between managers and fishermen: its frequency and procedures for electing officers and determining agendas.
- The Plan should specify the time sequence for implementation of new management measures adopted under the Plan..
- The Plan should list possible man-induced and natural environmental threats to the resource and make arrangements to keep them under review.

ANNEX 2

INFORMAL REPORT OF A WORKING GROUP ON REFERENCE POINTS FROM THE UNITED NATIONS CONFERENCE ON STRADDLING FISH STOCKS AND HIGHLY MIGRATORY FISH STOCKS

Technical Guidelines on Biological Reference Points

I. INTRODUCTION

1. The United Nations Convention on the Law of the Sea (articles 61 and 119) obliges States to take measures, based on the best scientific evidence available, to maintain or restore harvested stocks at a level which can produce MSY as modified by relevant environmental and economic factors. In order to accomplish this goal, MSY should be adopted as a limit reference point rather than a target reference point as described below. However, for already depleted stocks the biomass which can produce MSY may serve as an initial rebuilding target.

2. Many fish stocks around the world are currently depleted. Improvements in fishing technology have allowed fleet fishing power to increase rapidly and to move quickly from one fishery to another. Maximum sustainable yield (MSY) can often be exceeded in the early period of a fishery, resulting in resource depletion, associated ecological changes and serious economic problems. Although this is largely due to the lack of efficient controls, enforcement and compliance, the establishment of a set of biological reference points would contribute to better and more precautionary management.

3. Distinction should be made between limit reference points and target reference points. Limit reference points set boundaries which constrain utilization within safe biological limits and beyond which resource rebuilding programmes are required. Target reference points guide policy makers in resource utilization.

4. Reference points for a given stock are developed from biological models which need to take into account the best possible estimates of all sources of mortality, and should incorporate the special biological characteristics of each stock. Therefore, to develop reference points, stocks must be regarded as a biological unit throughout their range of distribution. Information on the state of the resource should cover the entire biological unit for comparison with reference points. This will require the identification of biological units for straddling fish stocks and highly migratory fish stocks.

This document is the report of the Working Group on Reference Points for Fisheries Management. The group agreed that all concepts contained in this document reflect its consensus. However, there was insufficient time available to polish the drafting of paragraph 4 in this report.

5. As pollution from land and sea-based sources affect fishery resources productivity and resilience, as well as fishery product safety and quality, management should include not only reference points and measures to control fishing, but also action to promote the reduction and, where feasible, the elimination of pollution and degradation of critical habitats.

6. The documents prepared by FAO for the Conference on the precautionary approach and reference points for fisheries management contain useful information and further guidance on these subjects and should be used in conjunction with the present document.

II. DEVELOPMENT OF MANAGEMENT OBJECTIVES

7. Prior to deciding upon a set of reference points, management objectives must be agreed upon. Reference points are not management objectives; they simply serve as a guide to aid managers in choosing from the range of options open to them.

8. The concept of optimal utilization in the United Nations Convention on the Law of the Sea includes the importance of economic and environmental factors as a basis for setting fisheries management objectives. However, optimal utilization does not have a simple technical definition and cannot be addressed with a single reference point. Therefore, a set of reference points is needed to take these factors into account, on the basis of the best scientific evidence available and with an explicit recognition of certainty.

9. Objectives must be set explicitly in order to be able to assess the success of the management procedures. The setting of objectives should, whenever possible, include the specification of the relative importance of different objectives in the overall policy. As objectives are often not explicitly stated, scientific advice must aim at providing an analysis of management options and their implications for the fishery.

10. There are a wide variety of complex objectives in the development of management policy for straddling fish stocks and highly migratory fish stocks. States may have many, sometimes competing, management objectives. However a fundamental objective for all concerned must be the long-term conservation and utilization of fishery resources, and where feasible, other species of concern. That objective can be achieved, inter alia, through a precautionary approach to management of fisheries resources in their ecosystems.

III. TARGET AND LIMIT REFERENCE POINTS

11. A reference point is an estimated value derived from an agreed scientific procedure and an agreed model to which corresponds a state of the resource and of the fishery and which can be used as a guide for fisheries management.· Reference points should be stock-specific to account for the reproductive capacity and resilience of each stock and are usually expressed as fishing mortality rates or biomass levels.

12. Two types of reference points, limit reference points and target reference points, should be used. Limit reference points are designed for conservation and warn against the risk of overexploitation. Target reference points are designed to indicate when an objective is being approached.

13. Agreement on the appropriate technically defined set of reference points is a prerequisite for a common approach to the management of straddling or highly migratory resources. By introducing limit reference points for triggering pre-agreed management responses, action may be facilitated when a problem occurs.

14. The fishery management strategy should be developed in a multispecies context and describe the action that is taken as resource status changes. Management strategies need to be developed for each fishery, including newly developing fisheries, and account for the biological characteristics of the resources by the use of appropriate reference points. These management strategies should take into account species belonging to the same ecosystem or dependent on, or associated with, a target species.

15. Provisional limit and target reference points can usually be established, even when data are poor or lacking by analogy with other similar and better known fisheries. In all cases, reference points should be updated as additional information becomes available.

16. For broad application of the precautionary approach to stock conservation it is important to agree on a minimum international guideline for management. With respect to the use of reference points, an appropriate minimum guideline is to apply MSY as a limit on fisheries. Fishing mortality should not be permitted to exceed the level that would produce MSY and stock biomass should be maintained above the level needed to produce MSY. The choice of target reference points should be made such that there is low risk of exceeding the MSY limit reference point after accounting for all major sources of uncertainty. This guidance should be viewed as a minimum and not preclude more conservative management strategies.

IV. ACCOUNTING FOR UNCERTAINTY

17. To account for uncertainty, management strategies should be so designed that they will maintain or restore the stock at a level consistent with the selected reference points. Uncertainty always occurs in the advice with respect to the current position of the fishery In relation with the reference points. It is vital that uncertainty be quantified and used explicitly in the analysis.

18. The major sources of uncertainty are incomplete and/or inaccurate fishery data, natural variability in the environment and imperfect specification of models of the resources. Simulation studies which incorporate the expected variability and bias in input parameters and uncertainty concerning the factors controlling stocks should be used to scientifically evaluate management strategies. Results must be interpreted in a probabilistic way to reflect these uncertainties.

19. For a limit reference point, management actions should be taken if analysis indicates that the probability of exceeding the limit Is higher than a pre-agreed level. If a stock falls below a limit reference point or is at risk of falling below it, action on the fishery is required to facilitate the rebuilding of the biomass whether or not the decrease is caused by the fishery or is related to environmental fluctuations.

20. The estimates of the reference points should be continuously revised as fisheries evolve and new information is obtained, particularly in the case of stocks subject to strong environmental fluctuations. Both biological and environmental studies will be necessary to facilitate this updating.

21. To be amenable to scientific evaluation, management plans should specify, inter alia, the data to be collected and used for management and their precision, the methods of stock assessment, as well as the decision rules for determining and initiating management measures.

V. LINKAGE TO MANAGEMENT

22. In order to estimate reference points, states should cooperate to promote the collection of data necessary for the assessment, conservation and sustainable use of the marine living resources, and develop and share analytical and predictive tools. Precaution should be exerted at all levels of management, in defining data requirements, developing stock assessment methods, elaborating management measures. The need for precaution requires the development of an effective capacity to rapidly take action for resource conservation and management. To facilitate this, the selection of reference points should be flexible to allow practical approaches to management.

23. To design effective management strategies, the management process needs to be clarified. It should include the specification of management objectives, development of limit and target reference points, agreement on management actions and assessment of management performance with respect to the accepted reference points. Management steps should ensure that target reference points are not exceeded on average and that the risk of exceeding limit reference points is low.

24. In some fisheries, the management approach used has had the undesirable effect of deteriorating the quality of the data collected. Management procedures should specifically be designed to reduce uncertainties in the data.

ANNEX 3

A STANDARD CLASSIFICATION OF FISHING GEARS AND ASSOCIATED UNITS OF EFFORT IN TERMS OF PRIORITIES

A standard classification of fishing gears and associated units of effort in terms of priorities, as specified by the Ninth Session of the Coordinating Working Party on Atlantic Fishery Statistics (CWP) (Dartmouth, Nova Scotia, Canada, 17-23 August 1977) and modified by the *Ad hoc* Consultation on the Role of Regional Fishery Agencies in Relation to High Seas Fishery Statistics (La Jolla, California, 13-16 December 1993).

FISHING EFFORT MEASURES BY GEAR CATEGORIES

Level of Priority	Fishing Gear	Effort Measure Descriptors	Definition
A. FIRST	Surrounding net (purse seines)	Number of sets	Number of times the gear has been set or shot, whether or not a catch was made. This measure is appropriate when school size and packing density is related to stock abundance or sets are made in a random manner.
	(purse seines)	or Searching time	This represents time on the grounds less time spent shooting net and retrieving the catch as well as time hove to. This measure is complicated by the use of aircraft spotting as well as by the dissemination of information from vessel to vessel. The measure is appropriate when school size and packing density is unrelated to stock abundance and a set is only made when a school has been located.
	Beach seines	Number of sets	Number of times the gear has been set or shot, whether or not a catch was made.
	Boat seines (Danish seine, etc.)	Number of hours fished	Number of hours during which the seine was on the bottom and fishing.
	Trawls	Number of hours fished	Number of hours during which the trawl was in the water (midwater trawl), or on the bottom (bottom trawl), and fishing.

Level of Priority	Fishing Gear	Effort Measure Descriptors	Definition
	Boat dredges	Number of hours fished	Number of hours during which the dredge was on the bottom and fishing.
	Gillnets (set or drift)	Number of effort units	Length of nets expressed in 100-metre units multiplied by the number of sets made (= accumulated total length in metres of nets used in a given time period divided by 100).
	Gillnets (fixed)	Number of effort units	Length of net expressed in 100-metre units multiplied by the number of times the net was cleared.
	Traps (uncovered pound nets)	Number of effort units	Number of days fished times the number of units hauled.
	Covered pots and fyke nets)	Number of effort units	Number of lifts times the number of units (= total number of units fished in a given time period).
	Longlines (set or drift)	Numbers of hooks	Number of hooks fished in a given time period.
	Pole-and-line	Number of days fished	The number of days (24-hour periods, reckoned from midnight to midnight), on which any fishing took place, including days during which searching took place without fishing.

Copyright material

Level of Priority	Fishing Gear	Effort Measure Descriptors	Definition
	Troll	Number of line-days	Total number of line days in the given time period.
	Jigs, (hand and mechanical)	Number of line-days	Total number of line days in the given time period.
	Harpoons	Number of days fished	The number of days (24-hour periods, reckoned from midnight to midnight), on which any fishing took place, including days during which searching took place without fishing.
B. SECOND	All gears	Number of days fished	The number of days (24-hour period, reckoned from midnight to midnight) on which any fishing took place. For those fisheries in which searching is a substantial part of the fishing operation, days in which searching but no fishing took place should be included in "days fished" data.
C. THIRD	All gears	Number of days on ground	The number of days (24-hour periods, reckoned from midnight to midnight, in which the vessel was on the fishing ground, and includes in addition to the days fishing and searching also all the other days while the vessel was on the ground.

Level of Priority	Fishing Gear	Effort Measure Descriptors	Definition
D. FOURTH	All gears	Number of days absent from port	The number of days absent from port on any one trip should include the day the fishing craft sailed but not the day of landing. Where it is known that fishing took place on each day of the trip the number of "days absent from port" should include not only the day of departure but also the day of arrival back in port. Where on any trip a fishing craft visits more than one "fishing area" (as defined for statistical purposes) an appropriate fraction of the total number of days absent from port should be allocated to each "fishing area" in proportion to the number of days spent in each, so that the total number of days absent on the trip will be the sum of the number of days allocated to all of the different "fishing areas" visited.
E. FIFTH	All gears	Number of trips made	Any voyage during which fishing took place in only one "fishing area" is to be counted as one trip. When in a single trip a craft visits more than one "fishing area" an appropriate fraction of the trips should be apportioned to each "fishing area" in proportion to the number of days spent fishing in each, so that the total number of trips for the Statistical Area as a whole will be the same as the sum of trips to each "fishing area".

The Expert Consultation discussed the draft *Guidelines for responsible management of fisheries* (Document FI:CCRF/94/Inf.5, August 1994, presented as an annex to this report) and the needs and directions for its revision and improvement. Two informal working groups made a paragraph-by-paragraph commentary and critique of the document, one from the perspective of fisheries managers and the other from that of the technical staff responsible for implementing management guidelines. A new structure was proposed for the document, as well as a list of new topics to be addressed and a strategy for tackling this task. Appended are the reports of the two working groups and the proposed contents of annexes to the new guidelines.

ISBN 92-5-103691-8 ISSN 0429-9337

9 789251 036914

M 43 V6860E/1/6 95/1600